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RECORD OF DECISION INTERIM REMEDIAL ACTION BUILDING E5265 (BLDG 503) SMOKE PILOT PLANT BURN SITES SOILS OPERABLE UNIT EDGEWOOD AREA-ABERDEEN PROVING GROUND, MD

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APRIL 1995

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RECORD OF DECISION

for

INTERIM REMEDIAL ACTION

BUILDING E5265 (BLDG 503) SMOKE PILOT PLANT BURN SITES

SOILS OPERABLE UNIT

APRIL 1995

U.S. ARMY, EDGEWOOD AREA-ABERDEEN PROVING GROUND, MARYLAND

SECTION 1

DECLARATION OF THE RECORD OF DECISION

1.1 SITE NAME AND LOCATION

Building E5265 (Bldg 503) Smoke Pilot Plant Burn Sites Soils Operable Unit, U. S. Army Edgewood Area-Aberdeen Proving Ground, Maryland.

1.2 STATEMENT OF BASIS AND PURPOSE

This decision document presents a determination that an interim remedial action will be taken to excavate soil and ash from the Soils Operable Unit, Building E5265 (Bldg 503) Smoke Pilot Plant Burn Sites at the U.S. Army Edgewood Area-Aberdeen Proving Ground (APG-EA), Maryland. The excavated soil and ash will be moved to the Building 103 dump site where it will provide some of the fill necessary to form the required base prior to capping and covering of the Building 103 dump.

This determination was developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. Preparation of the Record of Decision (ROD) was directed by the Directorate of Safety, Health, and Environment (DSHE) for the Army as the owner/ operator. Support was provided by the U.S. Environmental Protection Agency (EPA) Region III and by the Maryland Department of the Environment (MDE).

The MDE concurs that this interim remedial action is protective of both human health and the environment.

1.3 ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Building 503 burn sites, if not addressed by implementing the interim remedial action selected in this ROD, may present imminent and substantial endangerment to public heath, welfare or the environment.

1.4 DESCRIPTION OF THE INTERIM REMEDIAL ACTION

The selected interim remedial alternative is excavation of the contaminated soil and ash in the Building 503 burn sites followed by disposal of the soil and ash at the Building 103 dump. The soil and ash from the Building 503 burn sites will form part of the required subbase under the capping and covering system for the Building 103 dump. Tests performed in 1993 indicate that the soil and ash waste is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).

1.5 STATUTORY DETERMINATIONS

The selected interim remedy is protective of human health and environment, and is cost effective. It also complies with Federal and State of Maryland requirements that are legally applicable, or relevant and appropriate to the interim remedial action. This interim remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site.

Selection of the interim remedial action is based on the need to provide a remediation of contaminated soil and ash located near Building 503. Remediation of the ground water in the Canal Creek Area is a complex problem, requiring a risk assessment and Remedial Investigation/Feasibility Study (RI/FS) which will evaluate remediation alternatives for the entire APG-EA. To reduce risk and address the immediate hazard posed by the soil and ash, the Army and EPA have resolved to address soil contamination at the Building 503 burn sites separately from contamination at other portions of the Canal Creek Area, by providing for early remediation of contaminated soil and ash in the burn areas. This interim remedy has a periodic review requirement to determine its effectiveness and whether further remedial actions are necessary. The risks posed by the Building 503 site will be further evaluated in an ongoing comprehensive human health and environmental risk assessment. If such evaluation reveals that no further remedial action of the soils at Building 503 is necessary to protect humanhealth and the environment, this action may be final.

LEAD AND SUPPORT AGENCY ACCEPTANCE OF THE RECORD OF DECISION
U.S. ARMY EDGEWOOD AREA-ABERDEEN PROVING GROUND,
MARYLAND FOR INTERIM REMEDIAL ACTION AT BUILDING E5265
SMOKE PILOT PLANT BURN SITES SOILS OPERABLE UNIT

Signature sheet for the foregoing Record of Decision for the Interim Remedial Action Soils Operable Unit, Building E5265 (Bldg 503) Smoke Pilot Plant Burn Sites at the U.S. Army Edgewood Area- Aberdeen Proving Ground between the U.S. Army and the U.S. Environmental Protection Agency (EPA), Region III, with concurrence by the State of Maryland Department of Environment (MDE).

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RECORD OF DECISION INTERIM REMEDIAL ACTION BUILDING 503 SMOKE PILOT PLANT BURN SITES SOILS OPERABLE UNIT EDGEWOOD AREA-ABERDEEN PROVING GROUND, MARYLAND

SECTION 2

DECISION SUMMARY

This Decision Summary provides an overview of the problems posed by the conditions at the Soils Operable Unit for Building E5265 (Bldg 503) Smoke Pilot Plant Burn Sites, the remedial alternatives and the analysis of those alternatives. Following that, it explains the rationale for the remedy selection and describes how the selected remedy satisfies statutory requirements.

2.1 SITE NAME, LOCATION AND DESCRIPTION

2.1.1 General

As shown in Figure 1, Aberdeen Proving Ground (APG) is located along the Chesapeake Bay in Harford County and Baltimore County, Maryland, about 15 miles north Baltimore. APG is divided into two main areas by the Bush River. The area north of the Bush River is referred to as the Aberdeen Area of APG, and the area south of the Bush River is referred to as the Edgewood Area of APG (APG-EA).

The Aberdeen Area was established in 1917 as an ordnance proving ground and was used historically as a testing area for tanks, ordnance items and other military equipment. The Edgewood Area was established in 1917 as the primary chemical warfare research and development center for the Army with activities including laboratory research, field testing of chemical munitions, pilot-scale manufacturing, and filling operations for chemical munitions. During World War I (WWI) and World War II (WWII) the APG-EA was also the location of production-scale chemical agent manufacturing.

Building 503 is located near the former location of old Filling Plant #2 (now demolished), at the intersection of Hoadley Road and Noble Road in the Canal Creek Area of APG-EA (see Figure 2). It was constructed in 1918, and was intended to house a filling plant for large-caliber shells. Construction was not completed prior to the end of WWI however, and there is no indication that the plant was ever completed or used for the filling of munitions with chemical agents. Despite this, Building 503 was commonly referred to in WWI literature as the large-caliber filling plant. Small surrounding buildings also were used for operations related to filling. During at least a portion of the period between WWI and WWII, including the early and mid-1930s, Building 503 was used as a garage, gasoline filling station and carpenter shop.

The Building 503 Burn Sites Soils Operable Unit consists of two ash-covered barren areas located east of Building 503 (see Figure 3), which were used for the open-air testing of experimental smoke mixtures and smoke munitions, and for disposing of experimental smoke mixtures and munitions by opening burning.

LEAD AND SUPPORT AGENCY ACCEPTANCE OF THE RECORD OF DECISION U.S. ARMY EDGEWOOD AREA-ABERDEEN PROVING GROUND, MARYLAND FOR INTERIM REMEDIAL ACTION AT BUILDING E5265 SMOKE PILOT PLANT BURN SITES SOILS OPERABLE UNIT

Signature sheet for the foregoing Record of Decision for the Interim Remedial Action Soils Operable Unit, Building E5265 (Bldg 503) Smoke Pilot Plan Burn Sites at the U.S. Army Edgewood Area- Aberdeen Proving Ground between the U.S. Army and the U.S. Environmental Protection Agency (EPA), Region III, with concurrence by the State of Maryland Department of Environment (MDE).

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The north burn area was used as early as 1943, and the south site was in use starting about 1951. Use of these sites for testing and disposing of smoke mixtures and munitions ceased in 1975. The north burn site is the larger of the two, with the approximate total surface area of 10,540 ft^2. The south site is smaller with a total area of approximately 2,160 ft^2. The total area of the two barren sites is estimated to be about 12,700 ft^2. The barren surface of the two burn areas can be characterized by visual observation of color and texture of the surface materials as two distinct areas: a central area covered with a granular ash and a surrounding perimeter or sandy soil with little or no vegetation. The ground surface is relatively level and flat with minor undulations and changes in elevation.

Buildings and facilities at APG-EA have been assigned numbers using different systems during various times periods. During the early 1960s the original numbering system, consisting of one- to four- digits numbers, was changed to a four-digit numbering system. There is no correlation between the old and the new numbering systems. In the new numbering system, Building 503 was assigned the number E5265. Historical maps and records use the old numbering system. Development of documents for the Building 503 interim remedial action drew on existing documents. Therefore, the old numbering system is used in this ROD.

2.1.2 Building 503 Area Geology

The geology at APG-EA was determined by the U.S. Geological Survey (USGS) in a study con- ducted in the Canal Creek Area. APG-EA is underlain by alluvial and estuarine sands, silts and clays forming alternating sand and clay layers. The sediments are divided into discrete aquifers and confining units that, from the surface down, are called (1) surficial aquifer; (2) upper confining unit; (3) Canal Creek Aquifer; (4) lower confining unit; and (5) lower confined unit. The surficial Canal Creek aquifers are connected hydraulically near the west branch of Canal Creek and in a paleochannel near the east branch of Canal Creek where the upper confining unit has been eroded. No known pumping activities affect the aquifers.

2.1.3 Building 503 Area Surface Water

The Building 503 site is not within the 100-year floodplain, and has a ground surface elevation from 14 to 25 feet above mean sea level (MSL). The topographic slope is to the southeast. Run-off from the south burn site is to the south/southeast. Run-off from the north burn site is predominantly to a sewer on the east boundary of the Building 503 complex, approximately halfway between the two burn sites. This sewer is part of the old chemical/storm sewer system that once served Filling Plant #2 and discharged directly into the east branch of Canal Creek.

This sewer is likely to receive contaminants from the Building 503 burn sites. Because the drain is at the lowest elevation in the vicinity of the north burn site, run-off from the north burn site collects in and around this drain, where it percolates into the soil or evaporates. It is possible that some run-off may flow from here to the east branch of Canal Creek. This chemical/storm sewer drainage system is no longer in

use. The system may have been blocked, and it appears that a pipe leading from the drain has been sheared. The entire drainage system of the Building 503 complex will be addressed as part of the overall Canal Creek RI/FS.

2.1.4 Building 503 Area Ground Water

The surficial aquifer is unconfined and is defined as the saturated part of the uppermost sand and gravel layer (0-35 feet) (USGS, 1989). Ground water-flow in the surficial aquifer is characterized mainly by local recharge and discharge with short flow paths. The surficial aquifer receives recharge from direct infiltration of precipitation, upward leakage from the Canal Creek Aquifer, and infiltration from leaky storm drains. Direct infiltration occurs over most of the aquifer surface area. The surficial aquifer discharges to surface water, leaky sewers and storm drains, and the Canal Creek Aquifer. Discharge to surface-water bodies occurs through streambanks, bottom sediments and marshes where an upgradient exists. The surficial aquifer is believed to discharge to the west branch of Canal Creek.

The Canal Creek Aquifer lies beneath the surficial aquifer with a thickness of 30-70 feet. It subcrops beneath the surficial aquifer where the upper confining unit is absent under the east branch of Canal Creek, and also near the west branch of Canal Creek. The Canal Creek Aquifer discharges vertically upward to the surficial aquifer in the paleochannel and near the west branch of Canal Creek if an upward head gradient exists between the two aquifers. Otherwise it flows to the southeast and down into a deeper confined flow system.

The lower confined aquifer is separated from the two overlying confining unit. The direction of flow in the confined aquifer is also east/southeast.

The USGS has installed four ground-water monitoring wells (wells 36A, 35B, 36C, and 36D) east of the north burn area. These four wells are part of the 168-well ground-water monitoring system in the Canal Creek Area. Well 36A is at 14.5 feet MSL and is screened at a depth of 10 to 15 feet in the surficial aquifer. Well 36B is at 14.3 feet MSL and is screened at 39 to 44 feet in the Canal Creek Aquifer. Well 36C is at 14.2 feet MSL and is screened at 56 to 61 feet in the Canal Creek Aquifer. Well 36D is at 14.2 feet MSL and is screened at 88 to 93 feet in the Canal Creek Aquifer. The depth to ground water is seasonally variable and falls in the ranger of 5 to 10 feet.

Several residential ground-water wells exist outside of the installation boundary, but they are located upgradient of the Building 503 site with respect to ground-water flow, and are unlikely to receive contaminants from the burn areas under current or probable future use conditions. The aquifer that is tapped by these wells is the deeper aquifer in the lower confined unit. This unit may not be contaminated, and is hydraulically independent of the contaminated surficial and Canal Creek aquifers. The Army recently sampled several residential wells along the northern boundary of the APG-EA for target compound list (TCL) volatile organic compounds (VOCs), isopropylmethylphosphonic acid, methylphosphonic acid, thiodiglycol, organosulfur compounds, organophosphorous compounds, explosives, and radiologicals. The laboratory analysis did not find any APG-related contamination. The Army is currently sampling and analyzing ground-water from both the Canal Creek Aquifer and the Lower Confined Aquifer in the Northern Boundary Area to determine the distribution of contaminated ground-water, if any is present, and to determine whether it has migrated or is likely to migrate northward across the boundary onto off-post areas. The Army also intends to conduct a ground-water treatability study in the Canal Creek Area.

2.1.5 Building 503 Area Climatology

Due to the proximity of two large bodies of water (the Chesapeake Bay and the Atlantic Ocean), the climate at Aberdeen Proving Ground tends to be moderate as compared to the inland areas (ESE, 1981). The average annual temperature is 54.5 degrees Fahrenheit, with an average relative humidity of 73.8 percent. Precipitation average 44.8 inches/year over the past 21 years, with the maximum rainfall occurring in the summer and the minimum during the winter (WES, 1990). Snowfall averages about 12 inches per year (Sisson, 1985). Prevailing winds average 6.8 knots (Sisson, 1985) in a the summer months (ESE, 1981).

2.1.6 Building 503 Area Land Use

The region surrounding APG-EA is primarily residential, with some farming. The Gunpowder River and the Bush River are used for boating, fishing and other recreational purposes. There is passenger rail traffic on AMTRAK in a north/northeast direction immediately outside the installation boundary. State Route 40 runs in a north/northeast direction approximately 3 miles north of the installation. Interstate 95 runs in a north/northeast direction approximately 5 miles north of the installation. State Route 24 terminates at the main gate of APG-EA. The primary population centers near the APG-EA are the communities of Joppatowne/Magnolia (population 9,385) 1 mile west of the installation, Edgewood (population 23,313) directly adjacent to the installation, and Bel Air (population) approximately 52,000) about 8 miles north of APG-EA on route 24. The total population of Harford County is approximately 185,000.

Much of the area around Building 503 is developed. Both military and civilian personnel work in Building 503 and other nearby buildings. In addition, there are several residential areas (barracks and residential housing for military personnel and their families), an airfield, and several areas reserved for military training nearby. Several principal recreational areas are located east/southeast and southwest of Building 503. Horse stables and a horse grazing area are located directly east and southeast of Building 503. Horses are ridden in the grazing area and along roads around the Building 503 site. Baseball and softball fields and a swimming pool are located about 1,500 feet southeast of the burn sites. In addition, playing fields and a picnic area are located approximately 3,500 feet southwest of the burn sites.

The primary source of water for APG-EA has been surface water since the installation was established. Ground water has been a secondary source of water for APG-EA, and wells have been used to supply water when needs could not be satisfied by surface water supplies.

The primary drinking water source for APG-EA is Winters Run. The system which has supplied potabale water is the Van Bibber System. It consists of Atkisson Reservoir on Winters Run, the Van Bibber Treatment Plant, a small dam and reservoir at the treatment plant site, and a piping and tank reservoir system (Hanson Reservoir) to deliver the water to APG-EA. This system is unlikely to receive any contaminants from the Building 503 burn sites because it is located north and upgradient of the site.

2.1.7 Building 503 Area Flora and Fauna

The Building 503 area is grass covered except for the two barren burn sites. Land areas immediately to the north and east consists of open grass fields. The grassy area to the east and southeast is used as a grazing area for horses.

The Building 503 burn sites are not located in an area considered to be a wetland. A wetland area is located west/southwest of the site. Terrestrial wildlife in the area includes songbirds, groundhogs, field mice, deer, and rabbits. In addition, the bald eagle, an endangered species, is known to be present at APG. There are no bald eagle nesting or feeding grounds near the Building 503 burn sites. Aquatic invertebrates, fish and amphibians are not present in the Building 503 area.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.2.1 History of Site Activities

During WWII, Building 503 was set up as a filling plant for incendiary bombs. Incendiary filling was performed during the first half of 1942, and then the plant was remodeled as a smoke filling unit. Approximately 50,000 incendiary ordnance items were filled during this pilot operation, and additional ordnance items were filled during a brief period of production. The bulk of smoke filling during WWII was with a smoke formulation containing mainly aluminum, zinc oxide and hexachloroethane (designated HC smoke). Small amounts of colored smoke filling operations were also performed in Building 503. Items filled included 105-mm canisters, 155-mm canisters, M1 smoke pots, M77 bombs, 60-mm shells, 2.36-in rockets, and grenades. Nearly 2.5 million items were filled in Building 503 during WWII. Since so many of the items being filled were M1 smoke pots, Building 503 became know as the Smoke Pot Plant.

Open burning at the north burn area probably started in 1943, primarily for disposal purposes, with off-specification batches of HC smoke mixture being burned in bulk on the ground surface. Also, mixing and filling operations inside Building 503 usually generated waste in the form of dust and small spillage of mixture ingredients. This waste was swept up and taken outside and burned, or flushed with waste water into a concrete french drain. Solids that remained in the french drain after evaporation of the water were removed and taken outside and burned. Burning for testing purposes normally would have been accomplished with either munition items such as grenades, or with test mixtures in open containers or on small pads. After WWII most open burning was probably conducted as part of the testing of experimental smoke mixtures and experimental smoke munitions.

Whether for disposal or testing purposes, the burning of smoke mixtures involves the combustion or chemical reaction of the smoke mixture and oxidizing agent to produce clouds of particulates, which drift with the wind before they are deposited on the ground some distance from the burn area. Other smokes are generated by mechanically inducing particulates of the smoke material into the air. The smoke particles are mostly of aerosol size, and are dissipated into the atmosphere where they move downwind from the source for a distance before falling to earth. Also, when burning for testing purposes, the case of the smoke pot or grenade usually was damaged or melted to some degree. Such hardware residue was disposed of as scrap metal or left at the burn area. This is evidenced by the large number of grenade spoons and other munition components that have been found at the Building 503 burn sites. Fuses also have been uncovered at the burn sites.

In the years immediately following WWII, Building 503 facilities continued to be used for the filling of

smoke munitions, including smoke pots, candles and cluster munitions. Open burning and testing at the south burn site started at this time, probably around 1951. Gradually, however, Building 503 evolved into a research and development (R&D) facility used to blend and test experimental smoke mixtures and to fill experimental munitions. A wide variety of smoke mixtures were burned, with many different ingredients. Some filling was performed, but the scale of filling activities was much smaller than during WWII. Much of the filling work was pilot scale, but some production-scale filling was accomplished. Both HC and colored smoke (CS) munitions were produced. Some incendiary munitions also were filled in Building 503. Beginning in 1959, Building 503 was used for CS grinding and packing activities. During recent years much of the work has been with red phosphorous. Use of both the north and south burn sites for testing and disposing purposes ceased in 1975. The burn sites are not currently used by the Army.

Building 503 is still used as an R&D facility for pyrotechnic smoke mixtures and smoke dissemination hardware. These R&D operations in recent years have created little waste. During mixing and loading operations in bays along the east side of the building, water is used to keep dust and small spillage of mixture ingredients from accumulating and presenting a safety hazard. This waste water flows into a concrete french drain. Solids that remain in the french drain, and remain after evaporation of the water, are periodically removed and drummed for disposal as hazardous waste. Ventilation system dust collection units also discharge water to the french drain and collect solids for disposal. Spilled mixture ingredients and material from problem batches are drummed for later disposal.

2.2.2 History of Investigations/Remedial Actions

From 1976 through 1979, the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) conducted a surface and ground water investigation at APG-EA, including the Canal Creek Area. An initial assessment of the Building 503 burn sites was performed in 1976 as part of this investigation. In August 1985, APG contracted with the USGS to conduct a hydrogeologic assessment and an investigation of groundwater contamination in the Canal Creek Area. This investigation showed that groundwater beneath the Building 503 site is contaminated in the surficial aquifer and in the Canal Creek Aquifer. In 1989, the RCRA Facility Assessment (RFA) was performed by the U.S. Army Environmental Hygiene Agency (AEHA) to document historical activities at APG-EA related to solid-waste management, to identify potential sources of contaminant release in the Canal Creek Area, and to evaluate environmental quality at APG-EA with regard to past storage, treatment, and disposal of toxic and hazardous materials. The RFA recommended that the Building 503 burn sites be treated as an interim action. Additional soil sampling and analyses were performed by Roy F. Weston in February and March 1991 as part of a treatability study, and by Battelle in May 1993. Metals and semivolatile organic compounds were found in the soil during all these sampling events. A description of the soil and groundwater contaminants is summarized in Section 2.5.1.

2.2.3 Enforcement Activities

APG-EA has been listed by the EPA as a Federal facility meeting the criteria for inclusion on the National Priorities List (NPL) established pursuant to CERCLA. APG-EA entered the CERCLA process with Site Notification in January 1980. A Preliminary Assessment was completed in November 1980, and the Site Investigation was completed in December 1984. To facilitate the CERCLA process, APG-EA was broken down into several study areas. The Canal Creek Area is one of these study areas.

It is currently in the Remedial Investigation/Feasibility Study (RI/FS) stage. To facilitate this ongoing Canal Creek RI/FS, the Canal Creek Study Area was further subdivided into 50 Installation Restoration Program (IRP) sites, and solid waste management units (SWMUs) or operable units were identified at Creek Aquifer beneath the Canal Creek Study Area is also a separate operable unit. The results of individual IRP site Remedial Investigation/Feasibility Studies will be combined with investigation results from other APG-EA study areas and used to complete an overall ROD document for APG-EA by 1996. In September 1986 EPA issued a RCRA permit to APG which required an assessment of SWMUs at APG. In February 1990, APG-EA was placed on the NPL. Pursuant to Section 120 of CERCLA, 42 U.S.C. §9620, the U.S. Army and EPA signed a Federal Facility Agreement (FFA) in March 1990 which provides for the oversight and enforcement of environmental investigations and remedial actions selected APG-EA study areas. The Building 103 dump is one of the Edgewood Area study areas specified in the FFA. Regulatory oversight of the investigation is through the FFA.

2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Army described the scope and role of this operable unit to the APG Technical Review Committee (TRC) on July 29, 1993, and on January 27, 1994. The Focused Feasibility Study (FFS) (Battelle, 1994), Proposed Interim Remedial Action Plan (Battelle, 1994), and background documentation for the Building 503 Soils Operable Unit were released to the public for comment in May 1994. These documents were made available to the public in the local information and administrative record repository at the Aberdeen Public library, Edgewood Public library, Miller College library, and Essex Community College library. In accordance with the Federal Facility Agreement between EPA and APG, an information repository has also been

set up on APG in the TECOM Public Affairs Office. APG issued a press release announcing the availability of these documents to APG's full media list. APG placed news-paper advertisements on the availability of these documents and the public comment period/meeting in the APG News on May 4, 1994, in the Aegis on May 11, 1994, and in the Harford County edition of the Baltimore Sun newspaper on May 8, 1994 in the APG News, Aegis and Baltimore Sun. APG prepared and published a fact sheet on each item in the Proposed Plan and delivered it to on-post buildings close to the site and on-post libraries; APG mailed copies to its Installation Restoration Program mailing list. A 45-day public comment period on the scope and role of the proposed interim remedial action was held from May 4, 1994, to June 24, 1994. A poster session and public meeting were held on May 24, 1994, at the Chemical and Biological Defense Command conference center (Building E4810) at APG-EA. Approximately 35 people attended including citizens, members of the APG Superfund Citizen's Coalition (APGSCC), University of Maryland technical advisors to the APGSCC, and Federal, State and local Government representatives. At this meeting, representatives of the Army, EPA and the Maryland Department of the Environment (MDE) answered questions about the proposed interim remedial action at the Building 503 Soils Operable Unit and the cap and cover system remedial alternatives under consideration. Responses to comments received during this period are included in the Responsiveness Summary which is part of this ROD. The Responsiveness Summary is based on oral and written comments received during the public comment period. APG also met with representatives of the APGSCC and their technical advisors on August 24, 1994. The above actions satisfy the requirements of Sections 113(k) and 117 of CERCLA, 42 U.S.C. §9613(k) and §9617. The decision for this operable unit is based on the administrative record.

2.4 SCOPE AND ROLE OF THE SOILS OPERABLE UNIT

The Army and EPA have resolved to address soil contamination at the Building 503 burn sites separately from contamination in the ground water. Therefore, the interim remedial action authorized by this ROD addresses only the contaminated soil and ash at the Building 503 burn sites.

The purpose of this response is to address the current and future inhalation and incidental ingestion risk to personnel posed by the soil and ash. Although the Building 503 burn sites present little risk to ground water and surface water, this response will also minimize contaminant migration to ground water and to surface water bodies.

The Army is addressing ground-water contamination beneath the Building 503 site as a part of the on-going Canal Creek RI/FS, which includes a plume definition study, an assessment of the APG-EA Northern Boundary, a ground-water monitoring program, and a ground-water treatability study.

2.5 SUMMARY OF SITE CHARACTERISTICS

The Remedial Investigation for the Building 503 burn sites included a review of historical data and several sampling and analysis events. A description of the burn sites and contaminants based on the RI results is summarized here.

2.5.1 Building 503 Burn Site Soil Information

Contamination is the result of the testing and disposal of pyrotechnic mixtures and munitions. Pyrotechnic compositions are low-explosive mixtures designed to produce illumination, heat or smoke. They contain some ingredients that serve as fuel, and others that function as the oxidizing agent. Smoke munitions are designed either for signaling, as in the use of colored smokes, or for screening. Incendiaries are designed to produce heat for destroying a target either by melting a nonflammable target or by igniting a flammable target.

Some smoke and incendiary munitions [such as white phosphorus (WP) or petroleum-filled items] do not contain an oxidizing agent and are not considered pyrotechnic. Incendiary munitions contain compositions of chemical substances designed to destroy buildings and material by fire. They are of two types: scatter and intensive. Materials such as WP or petroleum products are used in scatter munitions and materials such as thermite and magnesium are used in intensive-type munitions. Use of many smokes involves combustion or chemical reaction of the smoke mixture and oxidizing agent to produce clouds of particulates. Other smokes are generated by mechanically inducing particulates the obscurant material into the air.

Because there are almost no records available, it is difficult to estimate the extent of disposal and testing operations at the Building 503 burn sites. It is known, however, that more field tests have been conducted at APG-EA with smoke than with other chemicals, and that, although hydrocarbon mixtures probably comprised the bulk of the chemicals burned at Building 503, a wide variety of organics, inorganic salts, metals, and dyes have been used in smoke mixtures.

Prior to 1950, the most common smokes in use with the Army were WP, HC and fog oil. Hexachlorethane (HCE) was an ingredient in HC smoke mixtures. Fog oil is a paraffin-free low-viscosity petroleum product that is heated during dissemination from a smoke pot or mechanical smoke generator and makes smoke by the

condensed droplet scattering light. Other smoke mixture ingredients included metallic oxides; hexamethyltetramine; chromyl chloride; sodium metal and nitrates; and chlorates of sodium, potassium and ammonium. Sodium metal was used as a standard filling ingredient in bombs. During WWII, incendiary mixtures consisted of black powder (potassium nitrate, charcoal, sulfur), flaked and grained aluminum metal, sulfur, castor oil, barium nitrate, and thermite (aluminum powder and ferric oxide.)

Since 1950, more tests have been performed with colored smokes, fog oil and similar materials, and with special obscurants. Organics used in colored smokes included anthracene; benzo(a)anthracene; benzo(a)pyrene; benzo(b)fluroanthene; benzo(k)fluoranthene; chrysene; fluoranthene; indeno (1,2,3- cd)pyrene; pyrene; 1,2,4-trichlorobenzene; 4,4'-DDT; 4,4'-DDE; 4,4'-DDD, and 7H-naphthalene. The compound 1-methylamino-anthraquinone is the dye Disperse Red 9, and (benzide) anthracene-7-one and 2-amino-9, 10-anthracenedione are dye degradation products. Mirex was used by the Army as a color- enhancing material in colored dye mixtures, and was almost certainly introduced into the soil and ash by testing and/or waste burning of color-enhanced mixtures. Tetrachloroethylene, hexachlorobenzene (HCB), and hexachlorobutadiene could have been ingredients in smoke mixtures or could be thermal and/or environmental degradation products of smoke mixture components.

Several investigations have studied the soil and water contamination and potential risks due to contamination in the Building 503 burn sites. The results of these investigations are described in an environmental survey of Edgewood Area (Nemeth et al., 1983), the RCRA Facility Assessment (Nemeth, 1989), data by USGS (USGS, 1989), the S/S Treatability Study under the Response Engineering and Analytical Contract (REAC) (U.S. EPA, 1991c), the preliminary risk assessments (AEHA, 1992 and ICF/Kaiser Engineers, 1993) and soil sampling data (Battelle, 1993a).

All sampling events indicated elevated levels of heavy metals, and volatile and semivolatile organics in the soil and ash, with the highest contaminant concentrations being present in the ash and in the soil under the ash to a depth of 12 in. Inspection of the Building 503 burn sites shows that the ash overlying the soil is roughly 6 to 12 in thick in the center of the burn sites.

Results of the USGS Study. In 1987 the USGS installed four (4) ground-water monitoring wells east of the north burn site. These two wells are part of the 168 well ground-water monitoring system in the Canal Creek Area. Chemical analysis of ground water from 1987 sampling data indicate that the surficial aquifer at this location is contaminated with elevated levels of methylene chloride, trichloroethylene and tetrachloroethylene. Additional sampling and analysis in 1988 and in 1989 indicated that the surficial and Canal Creek aquifers are contaminated with elevated levels of zinc, lead, iron, arsenic, barium, boron, vinyl chloride, ethyl benzene, and methylene chloride. The spatial distribution of ground-water contamination has not yet been determined; however, an overall plume definition study is being performed as part of the Canal Creek RI/FS. No surface-water sampling has been performed at the Building 503 burn sites.

Results of the REAC Treatability Study. Sampling and analysis of the soil and ash at the Building 503 burn sites were conducted in 1991 by the U.S. EPA Response Team and the REAC personnel. From the two burn sites, 5-gallon composite samples were collected. Only the ash material was collected. The ash was crushed and screened to a particle size of < 3/8 inches, placed in a 5-gallon bucket and homogenized. Various layers could be seen in the ash, and pieces of metal casing also were scattered on the site.

Raw waste samples were sent for Base, Neutral, Acid Extractables (BNA) analysis; Toxicity Characteristic Leaching Procedure (TCLP) metals (As, Ba, Cd, Cr, Pb, Hg, Se, and Ag) analyses; total metals (A1, As, Ba, Cd, Cr, Fe, Pb, Mg, Hg, Se, Ag, and Zn) analyses; and TCLP organics (HCE and HCB) analyses. In addition, solidification treatability tests were performed.

The analysis results indicated that untreated ash exhibited the toxicity characteristic due to leachable lead. Samples showed TCLP leachable lead of 7.7 mg/l and 6.2 mg/l for ash from the north and south sites respectively, which is slightly higher than the TCLP limit of 5 mg/l. The ash and surrounding soil also contained high concentrations of zinc and elevated levels of the following metals: arsenic, barium, cadmium, chromium, iron, mercury, selenium, silver, manganese, and aluminum.

Elevated levels of the following volatile and semivolatile organics were found: mirex, HCB, HCE, hexachlorobutadiene, tetrachloroethylene, and tributyl phosphate. HCB and HCE were present in the highest concentration with total (BNA extractable) HCE and HCB concentrations being 92.6 and 47.5 mg/kg for HCE and HCB, respectively, at the north burn sites. Leachable concentrations were well below toxicity characteristic levels at 0.048 and <0.01 mg/l for HCE and HCB, respectively, in composite samples from the north and south burn sites. Explosives-related compounds were not detected.

The sampled ash from the two burn sites was composited for a solidification test. Ash from the north and south burn sites was mixed in a 2:1 proportion and treated with portland cement or a portland cement/latex admixture. Cement was added at 5%, 10%, 15%, and 20% concentrations based on the weight of the

waste to be solidified. Following a 28-day curing period, the treated waste samples were analyzed for TCLP lead and cadmium, TCLP semivolatiles, multiple extraction procedure lead and cadmium, and total semivolatiles. Solidification reduced the leachability of lead, cadmium, hexachloro- benzene, and hexachloroethane. The performance of the cement/latex mix was no better than that of cement alone. Samples treated at 10%, 15%, and 20% with cement gave lower (better) lead and cadmium extraction levels than the 5% samples.

Results of RCRA Facility Assessment Sampling. Sampling of the soil and ash at the Build- ing 503 burn sites also had been accomplished in 1986 as part of the RFA.

The analyses for volatile and semivolatile organic compounds demonstrated that low mg/kg levels of compounds related to smoke mixtures and burning are present in the soil and ash at the Building 503 burn sites. HCE was an ingredient in HC smoke mixtures. The dye Disperse Red 9 (1-methylamino-anthraquinone), 7H-(benzide) anthracene-7-one and 2-amino-9, 10-anthracenedione are dye degradation products. The sample 9T extract was green indicating the presence of a dye. Mirex was used by the U.S. Army as a color-enhancing material in colored dye mixtures, and it almost certainly present in the soil and ash because of test and/or waste burning of those mixtures. It is likely that tetrachloroethylene, HCB, and hexachlorobutadiene were ingredients in smoke mixtures, or are thermal and/or environmental degradation products of smoke mixture components. The tetrachlorethylene is more likely a degradation product than a mixture component.

The analyses showed that the near-surface soil and ash in both the northern and southern burn sites have total zinc levels of greater than 10 percent. Above background levels of total cadmium, chromium, lead, and silver were also present in the near surface soil and/or ash in the burn sites. EP toxicity extracts contained cadmium, lead, and selenium, but not at levels that would classify the soil or ash as a hazardous waste. Explosives-related compounds were not detected in the soil or ash samples. A red stain in the steam condensate ditch at the northeast corner of Building 503 is due to iron rather than to red phosphorus.

Results of Battelle Soil Sampling. A Building 503 site sampling program was completed to supplement the existing data by studying the soils around and below the ash accumulation. Sampling and analysis focused on contaminants identified as potential chemicals of concern by the AEHA risk assessment (AEHA, 1992): HCB, HCE, lead, and zinc.

Prior sampling events quantified contaminant levels in the soil and ash below the ash to a depth of 6 inches or 1 to 2 feet. The additional sampling examined the perimeter areas and established contaminant levels at greater depths. The supplemental sampling also included analysis of several samples of the surface soil and ash to establish a statistical basis for evaluating the lead leachability toxicity characteristic. Locations of sample points used for analysis of the ash area and surrounding soils are summarized in Figures 4 and 5 for the north and south burn sites, respectively.

Spatial composite sampling to a depth of 3 inches was used to characterize surface contamination in the area of visible ash. Sample points were selected and 5 samples taken from the four corners and center of a 2 foot by 2 foot square around the selected sample point. These 5 subsamples were then composited, and mixed into a homogeneous sample for analysis. Subsurface samples below the actual surface sample points were collected by core borings to extract a series of samples at 1-foot-deep intervals for 1 to 2 feet, and 2 to 3 feet. Sampling in 1-foot intervals was continued for a single core boring at the north burn site, and for a single core boring at the south burn site until ground water was encountered (5-feet deep).

Perimeter surface samples in the bare area around the ash were collected using the five-point technique described, as were samples just below the grass on the outskirts of the barren area and in the horse pasture.

Analytical results showed that concentration levels of all contaminants were higher at the north burn site than at the south burn site. The highest contaminant levels were at the north burn area (see Table 1). Due to the low contaminant levels found in earlier studies, no organic analyses were performed on surface samples from the south burn site. At both burn sites, the highest contaminant levels occurred in the north end of the barren area. In the core samples, contaminant concentrations in the 1- to 2-feet depth interval were much lower than the concentrations in the surface samples. Contaminant concentrations continued to decrease in samples taken from deeper levels. Also, contaminant levels decreased significantly in samples collected in the barren soil and grass surrounding the ash area.

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Table 1 Highest Contaminant Levels at the North and South Burn Sites From Battelle Samples

Contaminant			Location
North Burn Site			
! Zinc	176,000.0	mg/kg	NA-1
! Lead	762.0	mg/kg	NA-2
! HCB	1.56	mg/kg	NA-1
! HCE	0.26	mg/kg	NA-1
South Burn Site			
! Zinc	23,800.0	mg/kg	SA-1
! Lead	167.0	mg/kg	SA-1

The highest zinc level outside of the ash area was 11,000 mg/kg in sample NB-1 located to the northeast of the north burn area. The highest lead level outside of the ash area was 379 mg/kg in sample SC-5 located southwest of the south burn site.

Soil and ash samples from the north and south burn sites were analyzed for TCLP lead. A total of 19 samples were analyzed for TCLP leachable lead. None of the results exceeded the regulatory threshold of 5.0 mg/l for lead. The highest values for TCLP lead in ash were 1.98 mg/l and 0.44 mg/l in the north and south burn sites, respectively. The highest values for TCLP lead in soil were 0.64 mg/l and 0.56 mg/l in the north and south burn sites, respectively. Therefore, the material to be managed is not a RCRA characteristic hazardous waste.

2.6 SUMMARY OF SITE RISKS

2.6.1 Human Health Risks

This section describes the methods and assumptions used to determine the remediation goals for the Building 503 north and south burn sites. The rational used in developing these PRGs is outlined in the preliminary risk assessments (AEHA, 1992; ICF/Kaiser Engineers, 1991, 1993).

The major metal constituents in the Building 503 ash are zinc, iron and aluminum. Low concentrations of arsenic, barium, cadmium, chromium, lead, manganese, and silver also have been identified. Some organics, mainly HCB and HCE also have been found. Based on evaluation of total concentration, leachable concentration, and toxicity, HCB, HCE, lead, and zinc were selected as the chemicals of concern to be evaluated in the risk assessment.

The preliminary risk assessment concluded: (1) off-site migration of contaminants is possible, because wind and surface water could transport contaminants to adjacent areas such as the horse stables, and to the east branch of Canal Creek through the old strom drain; (2) there is no current direct off-site public contract with contaminants because the Building 503 burn sites are remote from local communities and located in a secure area; (3) there is limited future potential public exposure via the ingestion and inhalation pathways due to the distance of off-site receptors; and (4) the possibility of accidental ingestion or inhalation of site contaminants is greatest when personnel are engaged in activity near the burn sites, for example for those mowing grass.

The preliminary risk assessment concluded that direct contact with incidental ingestion and inhalation of contaminants are the human exposure pathways most likely to be associated with potential health risks at the burn sites. Therefore, the exposure pathways used to assess the risks posed by the burn sites were incidental ingestion and inhalation of particulates. The health-based remediation goals discussed below are based on these pathways. Based on conservative exposure scenarios, the dermal pathway was not evaluated. The chemicals of potential concern identified from the preliminary risk assessment were HCB, HCE, lead, and zinc.

Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (1 x 10-6 or 1E-6). An excess lifetime cancer risk of 1 x 10-6 indicates that, as a plausible upper bound, an individual has a one in one million chance of developing cancer over a 70-year lifetime as a result of site- related exposure to a carcinogen under the specific exposure conditions at a site.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the hazard index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

The preliminary risk assessments concluded that contaminants in the ash and soil could exceed EPA-recommended (maximum) risk levels for both carcinogenic and noncarcinogenic contaminants, with a total excess lifetime cancer risk of 1 x 10-5, and a HI of 1 for the inhalation pathway and 4 for the ingestion pathway (the total HI is 5).

Typically, for sites undergoing remediation the EPA excess lifetime cancer risk point of departure for determining remediation goals is 1 x 10-6 for carcinogens and an HI greater than 1 for noncarcinogens. Because the potential cancer risk falls within the 1 x 10-6 to 1 x 10-4 range, and because the HI for the Building 503 burn sites exceed EPA's point of departure for noncarcinogenic effects (HI for receptors at the site exceeds 1), the preliminary risk assessments concluded that the risk posed by the soil and ash should be addressed. The toxicity criteria for chemicals of concern related to human receptors are shown in Table 2.

2.6.2 Environmental Evaluation

A comprehensive ecological risk assessment has not yet been completed for the Building 503 burn sites. However, in addition to the health risk to human receptors, the preliminary risk assessment briefly attempted to qualitatively address the risks posed by the burn sites to horses at the stable adjacent to the site, and attempted to establish remediation goals for non-human receptors.

Table 2 Oral Toxicity Criteria for Chemicals of Concern at the Building 503 Burn Sites

	Oral Toxicity Criteria(a)	
Chemical	Cancer Slope Factor(b) (mg/kg-d)-1	Reference Dose (mg/kg-d)
Hexachlorobenzene	1.6 [B2]	8 x 10-4
Hexachloroethane	1.4 x 10-2 [C]	1 x 10-3
Lead	N/A [B2]	N/A
Zinc	N/A [D]	3 x 10-1

(a) Source: USEPA (1993) (b) Bracketed letters are USEPA weight-of-evidence

Plants in the vicinity of the burn sites will be exposed to the soil throughout their life span. No data were found for HCB or HCE toxicity to plants, and only limited data were found for lead and zinc toxicity. The data were insufficient to establish concentration-based remediation goals for the chemicals of concern based on impact to plants. The central portions of both burn areas contain little or no vegetation, which is assumed to be the result of phytotoxic levels of the chemicals of concern.

During several visits to the burn sites, it was apparent that horses seemed to prefer grazing and standing in the shade of trees immediately next to the eastern boundary fence of the Building 503 compound, and thus could be exposed to contaminants via the ingestion and inhalation pathways. No data were found for HCB or HCE toxicity to livestock. Eisler (1993) reports that zinc is relatively nontoxic to mammals, and livestock are particularly resistant to zinc. Adverse effects in adult horses in the vicinity of a lead-zinc smelter were reported at a zinc dose of greater than 90 mg/kg. This dose was converted to a toxicity reference value for horses by assuming that soil and/or grass containing zinc comprises 10% of a horse's dietary intake of 9.6 kilograms and that the horse weighs roughly 500 kilograms. The National Academy of Sciences (NAS) (1980) cited a 1973 study by Knight and Bureau in which lead poisoning was observed in horses grazing in pastures near a smelter. The reported concentration of lead in the soil was 325 mg/kg (dry weight).

The preliminary risk assessments identified no endangered or protected species that would be impacted by not remediating the burn areas. Bald eagles in APG-EA are unlikely to be disturbed during the remedial activities at the Building 503 burn sites because they are not known to nest or feed in this area. The burn sites could potentially pose an ecological risk to aquatic species if contaminants are being transported to the east branch of Canal Creek through the old chemical/storm sewer system.

The analysis of contaminant fate and migration involves determining how a chemical will behave when it is released into the environment. This behavior can be described in terms of the following processes: transformation, transport and transfer. Transformation processes alter the chemical through physical, chemical, and/or biological reactions or by reaction with another chemical. Fate is the combination of these transformation processes and controls how long a chemical will persist in the environment. Transfer processes distribute a chemical between sectors of the environment, whereas transport processes act to redistribute a chemical within a given sector of the environment. For purposes of transport discussions, the environment typically is subdivided into four sectors: air, soil, ground water, and surface water. Migration is the combination of transport and transfer processes. Migration controls the spatial and temporal distribution of a chemical with time.

Although the soil and ash appear to be relatively stable, some off-site migration in the form of dust and particulates probably occurs via the aerial pathway from both burn sites to adjacent areas. Some downward movement of contaminants to ground water would also be expected to occur over time in the absence of remediation. Also, there is also a limited potential for off-site migration of contaminants via surface water run-off through the old chemical/storm sewer system. Surface water bodies are unlikely to be greatly impacted by contaminant run-off, or by aerial dispersion of contaminants from the burn site soil and ash.

Slow environmental degradation of the organic contaminants is expected to occur at both burn sites. There would be no environmental degradation of the metal contaminants. The organics are most likely present dissolved in pore water or sorbed on mineral or soil organic materials. These organics will undergo slow natural chemical transformation due to biological action and oxidation. The metals are most probably present as oxides, hydroxides or hydrous oxides. In summary, some environmental degradation of the organics is expected to occur over time; however, there would be no environmental degradation of the metals in the absence of remediation.

2.6.3 Remedial Action Criteria

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the interim remedial action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare or the environment.

Remediation goals were considered for the following four potential receptors: 1) Individuals mowing grass at Building 503; 2) Individuals who work inside and outside Building 503 on a daily basis; 3) plants; and, 4) horses at the adjacent horse stable.

Because a comprehensive ecological risk assessment has not yet been completed for the Building 503 burn sites, the preliminary risk assessment developed remediation goals for the chemicals of concern using risk criteria for human receptors. A comprehensive human health and ecological risk assessment for the Canal Creek Area is on-going as part of the RI/FS. This comprehensive risk assessment will also address the Building 503 burn sites. Based on the results of this risk assessment, additional remedial measures could be implemented if required.

Health-based remedial action criteria for human receptors were developed using the cancer slope factor and/or reference dose for HCB and HCE and the reference dose for zinc. Lead concentration criteria were developed based on a reported limit for a sensitive population, e.g., children up to 6 years old, and on OSWER Directive #9355.4-12, Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, which recommends a screening level of 400 mg/kg for lead in soil for residential land use (currently there are no criteria for establishing remediation goals for lead in industrial soils). Although young children and residential land are not truly applicable to the industrial scenario, use of a sensitive population gives a conservative remedial action criterion.

Assumptions for exposure conditions for determination of remedial goals based on the above potential receptors are summarized below. Remediation goals were calculated using standard EPA guidance (U.S. EPA, 1991a, 1991b, 1993), and were based on the assumed exposure conditions and the applicable toxicity criteria.

Individuals mowing grass were assumed to mow grass in the vicinity of the burn sites for 1 dy/wk for 28 wk/yr for 25 years. Incidental ingestion of soil and/or ash was assumed to be 480 mg/dy, which is the default value recommended by the EPA fir a construction worker (U.S. EPA, 1991a).

Industrial workers inside the building also could be exposed to chemicals in the soil and ash from the burn sites. For example, workers might park vehicles in the vicinity of the burn sites. Thus they potentially could be exposed to airborne particulate from the burn sites for about 15 minutes prior to work, 1 hour at lunch, and 15 minutes after work. Additionally, dirt brought inside the building on clothes or as airborne dust could expose workers in the building. Also, it is possible that future activities at the plant might involve more work time outdoors. As a conservative estimate, exposure to workers inside the building could approach that of workers outside. Therefore, the exposure to workers employed at the plant is estimated based on a work time of 5 dy/wk for 50 wk/yr for 25 years (U.S. EPA, 1991a). Incidental ingestion of soil and/or ash was assumed to be 480 mg/day.

The use of 480 mg/day incidental soil ingestion is based on typical outdoor construction. The work involves vigorous outdoor efforts during the 8-hour period with constant exposure to extensive areas of barren soil and ash with dust produced by ongoing excavation and earth-moving activities. The 480 mg/dy is an upper bound estimate that is conservative for grass mowing and is extremely conservative for the building workers.

The risk assessment also recognized the obvious stress to vegetation at the burn sites; however the requirements for developing standards for non-human receptors are not as well defined. However, insufficient data were found to support a definition of a concentration-based cleanup level to protect the vegetation. A requirement to remediate the barren areas was established to account for the damage to local vegetation due to burn site contaminants. The remediation goals for horses were based on toxicity reference value for zinc from a report by Eisler (1993), and on a 1973 study by Knight and Bureau in which lead poisoning was observed in horses grazing in pastures near a smelter. The reported concentration of lead in the soil was 325 mg/kg (dry weight).

Table 3 Risk Assessment Scenario Results for Chemicals of Concern at Building 503 Burn Sites

Scenario	Health-Based Goals Grass Mowing Worker Scenario	Goals for Nonhuman Receptors(a) Industrial Chemical Horses	Goals for Nonhuman for Human Receptors
Hexachlorobenzene (mg/kg)	3.3	0.4	N/A
Hexachlorethane (mg/kg)	380.3	43.0	N/A
Lead(b) (mg/kg)	400.0	400.0	325.0
Zinc (mg/kg)	570,000.0	64,000.0	47,000.0

(a)Data not sufficient to establish quantitative remediation goals for plants. (b)Goals based on a 400 mg/kg screening level for lead in soil for residential land use.

Possible remediation goals from the preliminary risk assessment for human and non-human receptors are summarized in Table 3. Health-based goals for human receptors were developed using cancer slope factors and/or reference dose. Since there are currently no toxicity criteria (i.e., cancer slope factor or reference dose) available for lead, lead concentration goals were developed based on reported limits for a sensitive population; e.g., children up to 6 years old. A comprehensive human health and ecological risk assessment will still be performed for the Building 503 burn areas as part of the ongoing comprehensive Canal Creek Area RI/FS. Based on the results of the RI/FS, additional remedial measures could be implemented depending on the contaminant levels found and future land use plans.

The specific site average concentration remedial clean-up standards were taken from Table 3, and are as follows:

- Hexachlorobenzene 0.4 mg/kg
- Hexachloroethane 43.0 mg/kg
- Lead 400.0 mg/kg
- Zinc 64,000.0 mg/kg

Site averaging will be used in meeting cleanup standards. Confirmatory sampling will be conducted to ensure that these clean-up criteria are met. Because visual observation clearly indicated stressed vegetation around the burn sites, a vegetative cover will be established.

It should be pointed out that the remedial-action criteria for zinc and lead based on horses as the receptor are slightly lower than the goals for the industrial scenario. Soil samples taken east of the burn sites near the fence indicate that the concentrations of lead and zinc in soils accessible to the horses are substantially below clean-up standards based on impacts to horses. The horses are separated from the most concentrated contaminants at the burn sites by a fence; thus, the industrial scenario appears to be the most applicable.

2.7 DESCRIPTION OF ALTERNATIVES

2.7.1 General

Historical samples indicate the chemicals of concern (HCB, HCE, lead, and zinc) concentrations in the ash material of the burn sites are above the clean-up standards developed by the risk assessment. The Battelle sampling program also identified some ash area samples with concentrations of chemicals of concern above the clean-up standards. One of the north ash site surface samples had a lead con- centration in excess of the 400 mg/kg standard. Two north ash site surface samples exceeded the 64,000 mg/kg zinc cleanup standard. These two samples also had HCB levels exceeding the 0.4 mg/kg cleanup standard.

No chemicals of concern were identified at concentrations exceeding the clean-up standards beyond the ash area or in the soil below the ash. None of the grass area samples, perimeter area samples, or archive samples had lead levels exceeding the clean-up standards. None of the grass area samples or archive samples had zinc levels exceeding the clean-up standards. The Battelle sampling event did not analyze for HCB or HCE in the grass-covered area. The concentrations of HCB and HCE in the soil cores taken from below the ash area are all near or below the 0.01 mg/kg detection limit. A sample taken in 1986 from north of the building showed less than 0.1 mg/kg for both HCB and HCE. These data indicate that remediation of the barren areas will adequately treat the chemicals of concern in the north and south burn sites.

Removal or treatment of areas with sparse or no vegetation meets the remedial-action objective to decontaminate areas with stressed vegetation. Setting a remediating area boundary based on the barren areas will capture all of the ash-covered surface and the surrounding barren perimeter beyond. Figures 6 and 7 illustrate the general configuration of the planned surface area to be remediated. The extent of the barren area is estimated based on the measured position of sample points used during the 1993 sampling event. The final delineation will be done at the time of remediation by visual observation of vegetation at the site.

The expected excavation depth is about 1 foot. Excavation or treatment to about 1 foot is expected to meet the concentration cleanup standards and provide a volume of clean soil to support new vegetation. The volume of material requiring remediation is defined by considering the contaminant concentrations found in soil samples and by visual observation of the location of stressed vegetation at the site.

The estimated volumes requiring remediation are about 390 yd3 in the north burn site and about 80 yd3 in the south burn site, giving a total volume of 470 yd3 requiring remediation. Based on existing sampling data, excavation to about 12 inches would reduce the contaminant concentrations to approximately 31 mg/kg for lead, 2,040 mg/kg for zinc, and to less than 0.01 mg/kg for HCB and HCE at the north burn site, and to 27 mg/kg for lead, 384 mg/kg for zinc, and to less than 0.01 mg/kg for HCB and HCE at the south burn site.

Confirmatory soil sampling during the excavation process would ensure removal of the contaminated soil to the risk-based cleanup levels.

Five remedial alternatives were considered for the soil and ash at the Building 503 site:

1. No Action

2. Excavation, screening, dust control, air monitoring, disposal in an off-site industrial landfill, application of clean soil and grass cover to the excavation area

3. Excavation, dry screening, dust control, air monitoring, processing on-site by solidification/ stabilization (S/S), disposal in an off-site industrial landfill, application of clean soil and grass cover to the excavation area

4. Excavation, dry screening, dust control, air monitoring, disposal in an off-site RCRA Subpart C permitted facility, application of clean soil and grass cover to the excavation area

5. Excavation, dry screening, dust control, air monitoring, disposal to the Building 103 dump in the Edgewood Area, application of clean soil and grass cover to the excavation area

Some general site preparation activities will be required as the preparatory phase of Alterna- tives 2, 3, 4, and, 5. Site preparation will include provision for general access control and allowance for entry and staging of excavation equipment, storage boxes and trucks. Any needed site services and utilities, such as water or electricity, also will be arranged for during site preparation. The excavation will be performed with conventional earth-moving equipment such as backhoes, front-end loaders, dump trucks, and/or roll-off boxes. The depth of the excavation will be approximately 1 foot, so no sloping or confined space monitoring will be required. Air monitoring will be conducted during the excavation. Application of dust control agents or cover sheets will be used for dust control, as needed.

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The following general procedures will be provided to minimize short-term risk due to potential for encountering UXO. Prior to the start of remedial Alternatives 2, 3, 4 or 5, the area to be treated or excavated will be surveyed for UXO. The contaminated matrix will then be removed in 6-inch layers. The UXO clearance personnel will repeat the survey before the excavation of each layer.

The excavated soil and ash will be moved to a predetermined location near the screening area and passed through a screen formed by heavy parallel bars forming open slots 2 to 3 inches wide (grizzly screen). Material passing through the grizzly screen will drop directly onto a screen with 1-inch square openings. The screening operation will remove oversize debris. Nonexplosive oversize debris smaller than 3 inches in diameter will be added to the screened waste material. Any materials screened out of the contaminated ash and soil that are not suitable for disposal at the Building 103 dump site will be disposed of in accordance with applicable APG, state and federal regulations. Potentially explosive debris will be disposed of by the Army.

An excavated depression and surrounding disturbed soil will remain at the Building 503 burn sites following the soil and ash removal required to implement Alternatives 2, 3, 4, and, 5. The void left after excavation will be filled and graded to match natural contours using clean soil obtained from off-site. The backfilled area and surrounding damaged areas will be fertilized, seeded and mulched. Backfilling and revegetation will be performed using conventional construction equipment.

2.7.2 Description of Alternatives

Alternative 1: No Action. The No Action alternative at this site calls for leaving the site in its current condition. The No Action alternative is required by U.S. EPA RI/FS Guidance as a baseline against which other remedial alternatives may be compared. Under this alternative, the remedial goals will not be met. The No Action alternative has no captial costs.

Alternative 2: Excavation, Disposal at Off-Site Industrial Landfill, Backfill. The screened material will be transported to an off-site industrial landfill for disposal. The contaminated soil and ash will be moved in lined dump trucks or roll-off boxes on flatbed trailers. The contaminated soil and ash will be covered during transportation. The transportation route will use post and public roads. The total estimated cost of remedial operations for Alternative 2 is $115,820 including excavation; screening; disposal; and installation of clean soil and application of fertilizer, seed and mulch at the Building 503 sites.

Alternative 3: Excavation, On-Site Treatment by Solidification/Stabilization, Disposal at Off- Site Industrial Landfill, Backfill. The screened material will be treated on-site by S/S with portland cement, portland cement/fly ash, or similar inorganic binders. To every 10 pounds of material treated will be added

1 pound of dry binder. Sufficient water will be added to form a fluid mix. Mixing will be performed in a rolling drum mixer, pug mill or other mixing device.

After a 24-hour curing period, the S/S-treated materials will be transported to an off-site industrial landfill for disposal. The treated soil and ash will be moved in lined dump trucks or roll-off boxes on flatbed trailers. The treated soil and ash will be covered during transportation. The transportation route will use post and public roads. The total estimated cost of treatment operations for Alternative 3 is $207,220 including excavation; S/S; screening; disposal; and installation of clean soil and application of fertilizer, seed and mulch at the Building 503 sites.

Alternative 4: Excavation, Disposal at Off-Site RCRA Subpart C Permitted Landfill, Backfill. The screened material will be transported to an off-site RCRA Subpart C permitted landfill for disposal. The contaminated soil and ash will be moved in lined dump trucks or roll-off boxes on flatbed trailers. The contaminated soil and ash will be covered during transportation. The transportation route will use post and public roads. The total estimated cost of remedial operations for Alternative 4 is $278,560 including excavation; screening; disposal; and installation of clean soil and application of fertilizer, seed and mulch at the Building 503 sites.

Alternative 5: Excavation, Disposal at Building 103 Dump, Backfill. The screened material will be transported to the Building 103 dump where it will be contained by a cap and cover system to be constructed over the existing cover of the Building 103 dump. The excavated soil and ash from Building 503 would augment imported backfill required to form a level base for the new cap and cover system. The contaminated soil and ash will be moved in lined dump trucks or roll-off boxes on flatbed trailers. The contaminated soil and ash will be covered during transportation. The transportation route for the contaminated material will use only roads in the Edgewood Area. There will be no movement on public roads. The total estimated cost of remedial operations for Alternative 5 is $44,900 including excavation; screening; disposal; and installation of clean soil and application of fertilizer, seed and mulch at the Building 503 sites.

2.8 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The five interim remedial action alternatives developed for the Building 503 Smoke Pilot Plant Burn sites were evaluated using nine specific evaluation criteria. These criteria are:

Threshold Criteria

1) Overall protection of human health and the environment

2) Compliance with applicable or relevant and appropriate requirements

Primary Balancing Criteria

3) Long-term effectiveness and permanence

4) Reduction of toxicity, mobility or volume

5) Short-term effectiveness

6) Implementability

7) Cost

Modifying Criteria

8) EPA/State acceptance

9) Community acceptance

The following sections summarize the relative performance of each of the five alternatives with respect to the nine CERCLA evaluation criteria.

2.8.1 Threshold Criteria

Overall Protection of Human Health and the Environment. The overall protection criterion is a composite of the short-term effectiveness, long-term effectiveness, and compliance with ARAR criteria. As such, it addresses whether or not a remedy will (1) result in any unacceptable impacts; (2) control the inherent hazards (such as toxicity and contaminant mobility) associated with a site; and, (3) minimize short-term impacts associated with cleaning up the site. This evaluation provides an overall assessment of

the relative protection of each alternative to human health and the environment.

Alternative 1 provides no overall protection for workers in the vicinity of the site, or for human health or the environment. The risks posed by the site would remain at current levels. Alternatives 2 and 3 give good overall protection, whereas Alternatives 4 and 5 give very good overall protection of human health and the environment. For all cases involving containment or treatment, the contaminated soil and ash material is removed from its exposed position and transferred to a more controlled condition. Alternative 4 places the contaminated material in a closely monitored hazardous waste disposal site. Alternative 5 reduces travel distances and avoids transportation on public roads.

All alternatives eliminate the current and future health risk posed by the site since the soil would be excavated and removed from the site.

Compliance with ARARs. This criterion addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other environmental statutes and/or provide grounds for invoking a waiver.

Alternative 1 does not meet the risk-based cleanup standards and would result in violations of Federal Ambient Water Quality Criteria (AWQC) guidelines and State water quality standards in ground water, if movement of contaminants into ground or surface water were to occur.

Alternatives 2, 3, 4 and 5 comply with the ARARs by removing all soil and ash having contamination levels exceeding the cleanup action level.

Alternatives 2 and 4 which require movement of wastes off the installation will be in compliance with U.S. Department of Transportation regulations involving off-site movement of wastes.

Alternative 5 would meet the provisions of the Corrective Action Management Unit (CAMU) rule set forth at 40 CFR Part 264 Subpart S which authorizes on-site consolidation of wastes, and consequently placement of the contaminated soil/ash at the Building 103 dump. The Army does not need a permit or waiver from MDE in order to include the contaminated soil/ash as part of the fill material at the Building 103 dump. Land disposal restrictions do not apply to the soil/ash.

In accordance with Section 121(e)(1) of CERCLA and 40 CFR, Section 300.400(e)(1), no Federal, State, or local permits are necessary for CERCLA response actions conducted entirely on-site. Consequently, a Maryland discharge permit for storm water systems will not be required. However, all substantive requirements of such a permit must be met, and all alternatives would minimize erosion and control sediment run-off as required by Maryland Erosion and Sediment Control Regulations (COMAR 26.09.01.01) and Maryland Storm Water Management Regulations (COMAR 26.09.02).

National Pollution Discharge Elimination System (NPDES) requirements (40 CFR Parts 122-124) are not applicable since none of the alternatives under consideration result in discharge to surface water from a discrete source. Also, AWQC and Maryland Water Pollution Control Regulations (COMAR 26.08.01-04) should not be applicable to this interim remedial action since none of the alternatives under consideration will result in the discharge of pollutants to surface water or ground water.

Alternatives 2-5 will involve earthmoving operations which may result in particulate emissions to air. Alternatives 2-5 will comply with Maryland State-Adopted National Ambient Air Quality Standards and Guideline (COMAR 26.11.03), Maryland General Emission Standards, Prohibitions, and Restrictions (COMAR 26.11.06), Maryland Toxic Pollutants Regulation (COMAR 26.11.15) and Maryland Noise Pollution Regulations (COMAR 26.02.03). There will be no air emissions after completion of this interim remedial action.

Even though portions of APG-EA are considered wetlands, the Building 503 burn sites are not a wetland and are not within the 100-year flood plain; therefore 40 CFR Part 6, Appendix A (Response in a Flood Plain or Wetlands), and Executive Orders 11988 and 11990 do not apply to any of the alternatives under consideration.

This interim response action will not affect any endangered species at APG-EA, since no endangered species are present at the Building 503 burn sites.

2.8.2 Primary Balancing Criteria

The five criteria below are grouped together because they represent the primary factors upon which the analysis is based. They take into account technical, cost, institutional, and risk concerns. The level of detail required to analyze each alternative against these criteria is commensurate with the complexity of the site and the alternatives considered.

Long-Term Effectiveness. This criterion refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

Alternative 1 provides no long term protection to human health and the environment. With Alternative 1, the only long-term risk reduction results from slow, natural degradation of organic contaminants and from dilution and dispersal of metal and organic contaminants by weathering. Alternatives 2 and 5 provide good long-term effectiveness. In both cases contaminants are removed and contained by a cap and cover system. This cap and cover system will minimize infiltration of water to the contaminants, thus minimizing vertical migration of the contaminants to ground water, and will prevent airborne dispersion of the contaminants as particulates. Alternative 3 increases the long-term effectiveness by additional treatment of the soil and ash with cement to assist in immobilizing the contaminants. Alternative 4 increases the long-term effectiveness by placing the soil and ash in a RCRA landfill.

Reduction of Toxicity, Mobility, or Volume. This criterion refers to the anticipated performance of the treatment technologies that may be employed in a remedy.

Alternative 1 provides no reduction of the toxicity, mobility or volume of the contaminants. Alternatives 2, 3, 4 and 5 all provide excellent reduction of on-site contaminant volume, because the contaminants are removed from the Building 503 burn sites. For Alternatives 2, 4 and 5 the overall volume of the contaminated material remains the same. The total volume being disposed of in Alternative 3 may increase due to the addition of the cement binder. The cement addition used as part of Alternative 3 will increase the leach resistance of the waste, thus lowering the toxicity and mobility. Alternatives 2, 4 and 5 do not reduce the toxicity of the contaminants. Alternatives 2, 3, 4 and 5 greatly reduce the mobility of the contaminants. In each alternative the contaminated soil and ash material is removed from an exposed location and placed in a more controlled condition. For each alternative (other than no action), the contaminated ash and soil is excavated, moved to a landfill or dump site and immobilized by a cap and cover system. The cap and cover system prevents airborne dispersion of contaminants as dust or particulates and minimizes infiltration of water, thus, controlling contaminant migration to ground water.

Short-Term Effectiveness. This criterion refers to the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until clean-up goals have been achieved.

Alternative 1 has no short-term impacts because no remedial actions would be performed under this alternative. Because no remediation is required to implement the No Action alternative, no dust is generated, and worker risks from contaminant exposure and accidents during operation of remediation equipment are eliminated. Alternatives 2, 3, 4 and 5 provide good short-term effectiveness. These alternatives would all require approximately the same amount of time to implement after signing of the ROD. Alternative 3 would probably require the longest period of time to complete. Alternative 5 would probably require the least amount of time to complete.

There would be no short-term impacts to nearby communities under any of the alternatives due to the location of the site. Short-term impacts to civilian government employees, military personnel, on- site workers, and the environment are expected to be minimal under Alternatives 2, 3, 4, and 5. Personnel could be subjected to construction-related impacts (noise, dust, particulates) under all alternatives. This exposure is expected to be minimal. Exposure of personnel to site contaminants would be controlled with protective clothing, spraying of work areas with water to minimize dust, appropriate training, and through the use of air monitoring devices. No protected species or sensitive land areas are expected to be affected during remediation. Due to the nature of the site, there is a potential for encountering ordnance during excavation of the soil and ash. Transportation of hazardous materials is not expected to be necessary under any of the alternatives.

Implementability. This criterion describes the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the chosen solution.

There are no technical barriers to implementation of the No Action alternative. However, this alternative may encounter substantial administrative obstacles because the contaminants will not be remediated. The technical implementability of Alternatives 2, 3, 4, and 5 is excellent. These alternatives use readily available techniques. Excavation, solidification/stabilization with cement-based binders, transportation, and disposal are all established technologies that have been used at many sites. The required labor, materials, and equipment necessary to implement all these alternatives is readily available. Conventional construction equipment and techniques would be used to implement these alternatives. Alternative 3 would probably be the most difficult to implement since solidification/ stabilization would have to be performed on site.

Costs. This criterion addresses the capital for materials, equipment, and the O&M costs. The No Action alternative is the least expensive since it has no associated capital costs. The No Action alternative

involves continued routine maintenance costs (grass mowing), but no expenditures are specifically required to implement this option. Alternative 5 is the next least expensive to implement with an estimated cost of $44,900. Alternative 4 is the most expensive to implement with an estimated cost of $278,560.

2.8.3 Modifying Criteria

In accordance with RI/FS guidance (EPA, 1988), the final two criteria involving State and community acceptance were evaluated based upon the MDE and public comments to the Focused Feasibility Study and the Proposed Plan. The criteria are as follows:

Regulatory Agency Acceptance. This criterion indicates whether, based on their review of the Focused Feasibility Study, Proposed Plan, and the Record of Decision, the EPA and Maryland Department of the Environment concur with, oppose, or have no comments of the Selected Remedy. EPA, Region III and MDE both concur that Alternative 5 is protective of human health and the environment.

Community Acceptance. This criterion assesses public comments received on the Focused Feasibility Study and Proposed Plan. Community interest in the proposed action at the Building 503 burn sites soils operable unit has been moderate compared to other actions at APG. Most of the interest and comments were from one community group, the Aberdeen Proving Ground Superfund Citizens Coalition (APGSCC). APGSCC agreed that the soil should be excavated but preferred off-site disposal. APGSCC's comments and APG's response to these comments are contained in the Responsiveness Summary. Other questions from the community included wanting to know about safety procedures which would be implemented during excavation to reduce dust and possible exposure of workers or the public to the soil/ash. APG provided information to the community on health and safety procedures that will be implemented to protect workers and the general public. This information is also contained in the Responsiveness Summary.

Public input to the Proposed Plan for this site indicated general community agreement, that the soil/ash should be excavated. Therefore, APG does not believe that Alternative 1, No-Action, would be acceptable to the community.

APG has received input from the community that they desire cleanup funds to be spent prudently. Community members have also inquired about the transportation of wastes over public roads. The volume of soil is small; therefore, on-site treatment is not cost effective. Since alternative 5 is cost effective, and provides a feasible alternative in this situation to transporting the soil on public roads, APG believes it is an acceptable interim remedy.

2.8.4 Selection of Remedial Alternative. The selected alternative is Alternative 5.

2.9 DESCRIPTION OF THE SELECTED REMEDY

Based on the requirements of CERCLA and the detailed evaluation of the alternatives, the Army has determined that Alternative 5 (Excavation, Disposal at Building 103 Dump, Backfill) is the most appropriate alternative for Building 503 burn sites soils operable unit, and is therefore the selected remedy. This alternative was selected because it is protective of human health and the environment, feasible, and cost-effective. The time to implement Alternative 5 is 12 months after signing of the ROD.

The Building 503 Smoke Burn Sites Soils Operable Unit will be further investigated as part of the on-going RI/FS. The investigation will indicated if further remedial actions are required. Alternative 5 has a periodic review requirement to determine the effectiveness of this interim remedy and whether further remedial actions are necessary.

The clean-up standards to be met by the selected remedial alternative are:

- Hexachlorobenzene 0.4 mg/kg
- Hexachloroethane 43.0 mg/kg
- Lead 400.0 mg/kg
- Zinc 64,000.0 mg/kg

In addition, any barren area or areas of stressed vegetation around the burn sites will be excavated, backfilled with clean soil, fertilized, seeded and mulched to meet the clean-up standards.

The burn sites will be excavated to a depth of approximately 1 foot. The limits of excavation are approximately 10 feet outside the barren area perimeter at both the North and South sites. The location of the limits of excavation are based upon all of the soil data and the clean-up criteria presented in this ROD. UXO clearance will be performed in conjunction with the excavation. Air monitoring and dust control measures will be provided during remedial operations. Excavated material will pass through a soil screen to separate out any metallic objects, rocks or debris. The screened soil will then be loaded

into dump trucks. Any metallic objects, rocks or debris will be properly disposed of in accordance with APG, state and federal regulations. The dump trucks will be loaded as close to the screening area as possible in an effort to maintain any spilled soil within as small an area as possible.

Once the initial phase of excavation is complete, soil samples will be collected from the excavated areas for analysis. After the results of the analyses are obtained, additional areas requiring excavation, if any remain, will be identified. The excavation will continue in 6-inch lifts until sampling and analysis indicates that all samples are below the required cleanup levels for the constituents of concern.

The soil and ash from the Building 503 burn sites will form part of the required subbase under the cap and cover system for the Building 103 dump.

The range and expected cost for the major cost elements in Alternative 5 are shown in Table 4. The total estimated cost of treatment operations for Alternative 5 is $44,900 including excavation, screening, disposal, and installation of soil and grass cover.

Table 4 Cost Estimate for the Selected Interim Remedial Action for the Building 503 Burn Sites

Item	Range	Expected Cost	Unit of Measure	Total
Site Preparation	$3,000 to $7,000	$5,000	-	$5,000
Excavation	$5/yd3 to $11/yd3	8/yd3	470 yd3	$3,760
UXO Clearance	$2,000 to $8,000	$4,000	-	$4,000
Screening	$2/yd3 to $14.50/yd3	$8/yd3	470 yd3	$3,760
Air Monitoring	$5,000 to $20,000	$10,000	-	$10,000
Hauling	$3.70yd/3 to $6.09/yd3	$5.85/yd3	470 yd3	$2,750
Disposal	$0	$0	-	$0
Soil for Backfill	$5/yd3 to $25/yd3	$20/yd3	470 yd3	$9,400
Haul Soil to $3,880 Site	$0.15/yd3/mile to $0.40/yd/mile	$.28/yd3/mile	470 yd3, 30 miles	
Backfill and Revegetate	-	$5/yd3	470 yd3	$2,350
Total				$48,400

2.10 STATUTORY DETERMINATIONS

The selected remedy satisfies the requirements under Section 121 of CERCLA to protect human health and the environment, comply with ARARs, be cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

As required by Section 121 of CERCLA, use of permanent solutions and alternative treatment technologies or resource recovery technologies, and a preference for treatment as a principal element were considered. Resource recovery as a principal element was not found to be cost effective for the Building 503 soil and ash. Also, on-site treatment by solidification/stabilization was not found to provide additional protection to human health and the environment.

The selected interim remedy will reduce risk and address the immediate hazards posed by the Building 503 Smoke Burn Sites Soils Operable Unit. It is protective of human health and the environment, and is cost effective. It also complies with Federal and State of Maryland requirements that are legally applicable, or relevant and appropriate to the interim remedial action. This interim remedy utilizes permanent solutions to the maximum extent practicable for this site. Alternative 5 has a periodic review requirement to determine the effectiveness of this interim remedy and whether further remedial actions are necessary.

The risks posed by the Building 503 Burn Sites Soils Operable Unit will be further evaluated in the ongoing comprehensive Canal Creek Area human health and environmental risk assessment. If further remediation is required, then the selected remedy for the Building 503 Burn Sites Soils Operable Unit will be consistent with those actions. If such evaluation reveals that no further remedial action for the soils at Building 503 is necessary to protect human health and the environment, this action may be final.

Overall Protection of Human Health and the Environment. The selected remedy will minimize the human health risks posed by the Building 503 burn sites through excavation of the contaminated soil and ash, movement to the Building 103 dump, and placement under a cap and cover system.

No unacceptable short-term risks or cross-media impacts will be caused by implementation of Alternative 5. During remediation activities, adequate protection will be provided to the community and the environment by using methods described in a remedial action work plan. This plan will provide for monitoring and control of dust during excavation and movement of the contaminated soil and ash. In addition, workers will be provided with personal protective equipment and air monitoring during all phases of the remediation.

The possibility that UXO items could be detonated by equipment or personnel during the course of remedial activities make it necessary to screen the area for UXO prior to the commencement of any intrusive activities. By screening the area, the potential for accidental detonation of UXO during remedial activities will be reduced. Prior to any intrusive activities at the Building 503 burn sites, the area will be cleared for UXO. The clearance of the area, within the limits of disturbance, will be accomplished by a magnetometer sweep and a visual search for UXO. Any suspect objects detected by this sweep will be flagged and hand-excavated by UXO-trained personnel. Once exposed, the object will be identified and properly disposed of in accordance with APG regulations. Upon completion of the initial UXO clearance, the site will be staked out. The limits of disturbance, limits of excavation, soil screening area and decontamination area will be clearly delineated. The UXO clearance process will be repeated for every layer of soil removed.

Compliance with ARARs. Alternative 5 will meet with all substantive requirements for all ARARs listed in Table 5. The time to implement Alternative 5 is expected to be approximately 12 months after signing of this ROD.

Risk-based cleanup standards were developed for the chemicals of concern in the Building 503 burn sites. Contaminated soil and ash containing concentrations of lead, zinc, HCB, or HCE higher than the cleanup levels will be removed and moved to the Building 103 dump. Barren areas at the burn sites also will be excavated. Follow-up confirmatory sampling will ensure that soil and ash containing contaminant levels greater than the remediation goals have been removed. Excavation and removal of contaminated soil and ash will ensure that lead concentrations in the soil are below the 400 mg/kg screening level for lead in soil for residential land use.

Placement of contaminated soil from the Building 503 Soils Operable Unit at the Building 103 dump is authorized under the provisions of the CAMU rule set forth at 58 Fed. Reg. 8679, which authorizes on-site consolidation of wastes. The Army does not need a permit or waiver from MDE in order to include contaminated soil/ash from the Building 503 Soils Operable Units as part of the fill material. Land disposal restrictions (LDR) restrictions do not apply to the contaminated soil/ash.

In accordance with Section 121(e)(1) of CERCLA and 40 CFR, Section 300.400(e)(1), no Federal, State, or local permits are necessary for CERCLA response actions conducted entirely on site.

Consequently, a Maryland discharge permit for storm water systems will not be required. However, all substantive requirements of such a permit must be met. Alternative 5 shall minimize erosion and control sediment run-off as required by Maryland Erosion and Sediment Control Regulations (COMAR 26.09.01) and Maryland Storm Water Management Regulations (COMAR 26.09.02).

Since Alternative 5 may result in particulate emissions to air, Alternative 5 shall comply with Maryland State-Adopted National Ambient Air Quality Standards and Guidelines (COMAR 26.11.03), Maryland General Emissions Standards, Prohibitions, and Restrictions (COMAR 26.11.06), Maryland Toxic Pollutants Regulation (COMAR 26.11.15) and Maryland Noise Pollution Regulations (COMAR 26.02.03). There will be no air emissions after completion of this interim remedial action.

Alternative 5 is not expected to impact historically significant areas, wetlands, or critical habitats. No protected species or sensitive land areas will be affected during remediation. Transportation of hazardous materials could be necessary but is not expected to be necessary under this interim remedial action.

Cost Effectiveness. The selected alternative is the least expensive of the alternatives that comply with the ARARs. The estimated captial cost for implementation of Alternative 5 is $44,900.

Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable. The Army has determined that the selected interim remedy represents the maximum extent to which permanent solutions and alternative treatment technologies or resource recovery technologies can be utilized in a cost effective manner for remediation of the Building 503 smoke burn sites.

The most permanent solution is to remove the waste source and treat the removed waste. In-situ treatment of the waste was assessed in the Feasibility Study, however, in-situ treatment could not be implemented because of the potential for ordnance at the burn sites. Ex-situ treatment can be accomplished either on-site or off-site. The National Contingency Plan specifies a preference for on-site treatment. The ex-situ treatment option considered (Alternative 3) was stabilization of the waste followed by disposal in an off-site landfill. While this is a permanent solution, stabilization was found to provide little additional protection due to the nature of the waste. The other alternative (Alternative 4) deemed practical was to excavate the waste, and place the waste in a RCRA landfill. While Alternatives 2, 3 and 4 are permanent solutions, they increase the off-site risk since the waste would have to be transported over public highways. Also, off-site movement would merely transfer responsibility for the soil and ash to another location. Therefore, Alternative 5 was judged to be the most protective of human health and the environment, implementable, and cost effective.

Resource recovery was also evaluated in the feasibility study. Recovery of metals value or reuse allows minimization of the waste. The innovative resource recovery technology of high-temperature metal recovery (HTMR) was considered for possible resource recovery. However, due to the relatively low concentration of zinc and the small volume of material, HTMR was not found to be practicable.

Preference for Treatment as a Principal Element. While organic contaminants can be destroyed, metal contaminants such as lead and zinc cannot be destroyed by treatment. On-site treatment by stabilization with cement binders was evaluated as an alternative. This evaluation showed that stabilization would probably not be effective due to the diverse types of contaminants, and consequently would not provide much additional protection. Also, since treatment operations entail a high fixed cost for equipment setup, treatment of small volumes of waste is expensive per unit of waste treated. Due to the low concentration and volume of contaminants present, additional treatment would not be cost effective.

The selected interim remedy is the most cost effective and technically feasible approach to minimize the risks posed by the Building 503 burn sites. It does not satisfy the statutory preference for treatment as a principal element of the remedy because treatment of the principal site contaminants was found to be not practicable. However, the selected interim remedy reduces the mobility of contaminants. Excavation removes the waste from the Building 503 sites and provides the greatest reduction in toxicity, mobility, and volume of the site contaminants. By placing the waste in the Building 103 dump, the selected interim remedy is consistent with the Superfund program policy of containment, rather than treatment, for wastes that do not represent a principal threat if they are not highly mobile in the environment (40 CFR Section 300.430).

2.11 DOCUMENTATION OF SIGNIFICANT CHANGES

The selected remedy was the preferred alternative presented in the Proposed Plan. No changes were made.

Table 5 Review of Potential Action-Specific and Locational ARARs for the Building 503 Burns Sites Selected Remedy (See note 1)

Environmental Laws and Regulations	Consideration as an ARAR
ACTION SPECIFIC	
I. U.S. Department of Transportation (DOT) (49 CRF Parts 170-179)	Contaminated waste materials could be Regulations transported off-post under the selected remedy.
II. State of Maryland	
A. Maryland Noise Pollution Regulations (COMAR 26.02.03)	Maximum allowable noise levels shall not be exceeded at the burn site property boundaries during the selected remedy.
B. Maryland Erosion and Sediment Control Regulations	Excavation and backfilling activities may cause increased erosion and sediment runoff (COMAR 26.09.01) requiring the application of control measures during the selected remedy.
C. Maryland Stormwater Management Regulations (COMAR 26.09.02)	Stormwater shall be managed before and after the selected remedy.
D. Maryland Air Pollution Control Regulations (COMAR 26.11.03, 06, and .15)	The selected remedy involves earthmoving equipment operations that may result in emissions to air.
LOCATION SPECIFIC	
I. APG Disaster Control Plan, Annex C, Annex S (see note 2)	Ordnance could be uncovered during implementation of the selected remedy.

1. Note: All substantive requirements shall be met.
2. Note: Though not an ARAR, this APG plan would be followed in case of an incident/emergency.

SECTION 3

RESPONSIVENESS SUMMARY

The final component of the ROD is the Responsiveness Summary. The purpose of the Responsiveness Summary is to provide the public with a summary of citizen comments, concerns and questions about the Building 503 burn site interim remedial action and the EPA's and Army's responses to these concerns. During the public comment period from May 4 to June 24, 1994, on the Focused Feasibility Study and Proposed Plan for the Building 503 burn site in APG-EA, several written comments, concerns and questions were received by the Army. No comments, concerns, and/or questions were received by the EPA and/or the Maryland Department of the Environment. A public meeting wa held on May 24, 1994, to present the Proposed Plan, and to answer questions and to receive comments. Several technical questions were answered during the public meeting regarding the conduct of the investigation, and written comments and concerns were received. The transcript of this meeting is part of the administrative record for this Operable Unit. The transcript and public comments received by the Army are attached at Appendix A.

This responsiveness summary is divided into the following sections:

- Overview
- Background on community involvement
- Summary of comments received during public comment period and agency responses
- Public meeting attendance roster
- Panel of experts
- Selected newspaper notices announcing dates of public comment period and location/time of public meeting

This responsiveness summary gives the comments on the Proposed Plan by interested parties, and provides the Army's responses to the comments. All comments and concerns summarized below have been considered by the EPA in making a decision regarding the choice of the selected alternative for the Building 503 burn sites. Additionally, the Army and EPA are proposing with the issuance of the ROD to continue investigating the Building 503 burn sites and the related Building 103 dump area as part of the ongoing Canal Creek RI/FS. The results of this investigation will be incorporated into the ongoing Canal Creek RI/FS and Canal Creek Area ROD.

3.1 OVERVIEW

Both the U.S. EPA and the MDE concur that the preferred alternative is protective of human health and the environment. The selected interim remedy is excavation and transfer of the contaminated soil and ash to the Building 103 dump where it will form part of the required fill prior to installing a cap and cover system over the dump. The selected remedy will protect human health and the environment by reducing the mobility of the contaminants in the soil and ash.

APG has implemented a comprehensive public involvement program. The program includes public involvement activities for the review and selection of the interim remedial alternative for the Building 503 burn sites. The community has shown interest in the interim actions. In addition to APG placing project documents in several repositories and distributing fact sheets, APG has briefed the Technical Review Committee on two occasions, and a public meeting was held describing the interim action and soliciting public input on the plans. The Aberdeen Proving Ground Superfund Citizen's Coalition prefers a permanent solution which removes the soil and ash to an off-site location.

3.2 BACKGROUND ON COMMUNITY INVOLVEMENT

Community interest in the interim action has been strong, and APG has implemented a com- prehensive public involvement program. In addition to placing project documents in several repositories and distributing fact sheets, the Technical Review Committee had been briefed on two occasions, and a public meeting was held describing the interim action and soliciting public input on the plans.

Community relations activities for the proposed Building 503 interim action include:

- APG briefed the scope and role of this operable unit the Technical Review Committee on July 29, 1993, and on January 27, 1994. Representatives were also given a tour of the burn sites.

- APG released the Focused Feasibility Study (FFS) (Battelle, 1994), Proposed Interim Remedial Action Plan (Battelle, 1994), and background documentation for the Building 503 burn sites to the public for comment in May 1994. These documents were made available to the public in the local information and administrative record repository at the Aberdeen Public library, Edgewood Public library, Miller College library, and Essex

Community College library. In accordance with the Federal Facility Agreement between EPA and APG, an information repository has also been set up on APG in the TECOM Public Affairs Office.

! APG issued a news release announcing the availability of these documents to APG's full media list.

! APG placed newspaper advertisements on the availability of these documents and the public comment period/meeting in the APG News on May 4, 1994, in the Aegis on May 11, 1994, and in the Harford County edition of the Baltimore Sun newspaper on May 8, 1994.

! APG established a 45-day public comment period from May 4, 1994, to June 24, 1994, on the scope and role of the proposed interim remedial action.

! APG prepared and published a fact sheet on the Proposed Plan and delivered it to on-post buildings close to the site and on-post libraries; APG mailed copies to its Installation Restoration Program mailing list.

! APG conducted a poster session and public meeting on May 24, 1994, at the Chemical and Biological Defense Command conference center (Building E4810) at APG-EA. Approximately 35 people attended including citizens, advisors and members of the APG Superfund Citizen's Coalition, and Federal, State and local government representatives. Representatives of the Army, EPA, and the MDE answered questions about the proposed interim remedial action at the Building 503 burn sites operable unit and remedial alternatives under consideration.

! Responses to comments received during this period are included in the Responsiveness Summary which is part of this ROD.

3.3 SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND AGENCY RESPONSES

COMMENT SET 1 received from concerned Joppa, MD citizen. (NOTE: Comments pertaining to the Building 103 dump are included because the Building 503 Soils Operable Unit soil will be used as fill under the Building 103 dump cap and cover system.

> Ladies and Gentleman, Distinguished Guests, and Concerned Citizens:
>
> Although I agree with the U.S. Army's remedial action at Building 503 to remove white phosphorous contaminated soil, I have several questions concerning the approach to this decision and the additional hazards that I feel will be created due to these actions.
>
> Comment 1 Will any steps be taken to reduce the dust created during the excavation process (i.e., watering or dampening)?
>
> Response Yes. Various dust control procedures are being evaluated, including foams and biodegradable vegetable gums. A Work Plan and Health & Safety Plan will be written prior to beginning remediation. The Work Plan will detail the procedures which will be implemented to protect the health and safety of on-site workers and off-site personnel during the excavation of the soil and ash at the Building 503 burn sites operable unit. The Health & Safety Plan will also specify all measures which will be taken to minimize adverse health effects to on-site workers. It will require activities such as observation and monitoring of dust levels and provide for application of dust control procedures as needed.
>
> Comment 2 Will the contaminated soil be containerized prior to movement to the Bldg. 103 site?
>
> Response The contaminated ash and soil probably will be contained in a roll-off box or truck bed. The current design concept is to excavate the ash and soil with a backhoe or front end loader, and drop it directly into a truck for transport across the road to the Building 103 dump. The truck will be fitted with spray nozzles to dampen the soil and ash as it is being dumped to prevent dust generation. The box or bed will be lined with plastic sheeting. Once the box or bed is filled, the ash/soil will be covered with plastic sheeting so the truck will be covered while in transit. These provisions will control the escape of particulates during the short move from Building 503 to the Building 103 dump.
>
> Comment 3 How will construction personnel know if an existing cylinder or

UXO currently buried beneath the surface of Site 103 has been ruptured do to vibration and the weight of heavy equipment?

Response Continuous air monitoring for volatile organic compounds and chemical agents will be conducted during the construction activities at the Building 103 dump to warn personnel of any airborne release.

Comment 4 What safety precautions are being taken to contain any spillage or air release of hazardous materials do to the rupture or detonation of UXO's at the Building 103 site?

Response Both conventional and chemical ordnance items are frequently encountered during construction activities at APG. Though historical files were researched, the lack of data make it impossible to determine if ordnance items are present in the Building 103 dump, and the possibility of ordnance items being present in the dump cannot therefore be ruled out. In addition to the munition fill, explosive components of the munition also present a potential hazard. Explosive components in munitions include fuzes, supplementary charges such as boosters, and bursters. Fuzes contain the primary and most sensitive explosives that form the explosive train. The fuse may also contain a booster, the second most sensitive explosive that is usually needed to detonate the main fill in an high explosive (HE) munition. In chemical, and smoke munitions, the booster charge is replaced with a burster tube that is used to open the munition casing, scattering the inside fill over a wide area. Fuzes are the initiating element of the explosive train that detonates either the booster or the burster charge. A booster charge, as stated above, ignites the main explosive charge in HE filled munitions. The burster charge in chemical munitions is usually shaped like a long cylindrical tube and is found within the longitudinal center of the munition surrounded by the chemical agent fill. The burster is the main explosive charge responsible for scattering the munition contents.

No special safety precautions are being taken to contain spillage since the waste contained in the dump is not being excavated.

A safety precaution being taken to prevent the detonation of possible buried unexploded ordnance items is the spreading of fill dirt on the dump to dissipate the weight of personnel and equipment. Buried ordnance is subject to loads, which depend on munition diameter, depth of burial, unit weight, and frictional characteristics of the soil. While heavy equipment and increased backfill height will produce additional loads on buried ordnance, the additional vertical pressure dissipates laterally with depth in underlying soil and is not transmitted directly to ordnance items(s). Thus, only a portion of the additional pressure is transmitted to buried ordnance. The more fill is put down, the more the load is dissipated laterally. To further reduce this load, grading equipment equipped with wide tracks or tires will be used. Since pressure is defined as force per unit area, this will distribute the weight over a wider area, further reducing the point load. The fill material will be placed on the dump starting at the dump perimeter, and then will be graded towards the center.

The additional fill material also has the added benefit of containing detonations which may occur. The detonation may break the surface of the dump, and may affect other buried ordnance causing sympathetic detonations. The main factors in determining whether the explosion will break the surface are the amount of explosive and the depth of the ordnance item(s). If sufficient soil is present to absorb the energy released, then the explosion will be contained. This principle is used in in-situ emergency techniques for the destruction of single munitions. For example, single munitions encased in a plenum chamber filled with vermiculite or some other material can be safely detonated; the explosion is totally contained since the vermiculite absorbs the energy released (shock wave, heat, expanding gas). Another in-situ emergency technique is "massive encapsulation/burial." With this technique, the munition is buried under a mound of soil, which then absorbs the energy of the explosion.

It is unlikely that the additional load transmitted through soil would initiate a burster explosion in a non-fuzed munition since the casing is directly subjected to the load, and not the burster tube. The additional load might crack/deform the casing however. It is unlikely that an unfuzed burster will detonate due to additional pressure effects caused by earth-moving equipment or the added weight of a cap since the burster requires the fuse to initiate the secondary explosion. Bursters are relatively insensitive to shock.

Considerable corrosion will have occurred in any munitions buried in the dump, which will reduce wall strength, open seams, reduce threads, and allow water to seep in and the contents to leak. Chemical reactions will have occurred between the explosives, surrounding media and metal. Such reactions can form hazardous/sensitive components which are heat, and shock-sensitive. Fuzes in particular may contain small quantities of "sensitized" primers and detonators. It is conceivable that low-frequency vibrations of heavy equipment could be sufficient to detonate such age-sensitized fuzes in shallow buried munitions. Vibratory compaction equipment could have a similar effect. To minimize such low-frequency vibrations, non-vibratory compaction equipment will be used and the use of heavy grading equipment minimized until sufficient backfill has been put down. Also, since there is waste (such as the BBC tank that was emptied and the void filled with sand) close to the surface, grading will not take place on the original cover, and will commence only when sufficient backfill material is present.

Finally, an EOD team will be standing by during construction activities. All work will be preceded by a magnetometer sweep by EOD personnel of the entire work area. This will reduce the possibility of running over ordnance buried just beneath the surface, and uncovering already leaking rounds or rupturing intact rounds during operations.

Comment 5 What are the trade-offs depositing of the white phosphorous contaminated soil off-post instead of creating or adding to an existing hazard across the street at the Building 103 site?

Response While some white phosphorous munitions were probably tested and/or disposed of at the Building 503 burn sites, the main contaminants of concern at the Building 503 burn sites are lead, zinc, hexachlorobenzene, and hexachloroethane. Placement of the soil and ash from the Building 503 burn sites under the Building 103 dump cap and cover system will not create an additional hazard since the soil and ash will be contained under the cap and cover system. Placement of the soil and ash under the cap will provide a cost-effective way to reduce the potential for adverse effects from the Building 503 soil and ash without transferring the problem, and it allows the Army to retain control of its waste. Also, it will reduce the distance over which the contaminated material must be transported, and will reduce the risk of transportation accidents and public exposure to the contaminants as a result of transportation accidents or release during transportation. Finally, the effectiveness of this action will be monitored as part of the monitoring programs of the Building 103 cap and cover system. This monitoring program will determine if further remedial actions need to be undertaken at a later date.

Comment 6 I feel that the Army's role is to clean up existing hazardous waste, and not to create or add others. I also feel that due to the instability of UXO and buried canisters of unknown substances at Bldg. 103, a more hazardous situation exists, not only for the construction workers who are in direct danger, but the community as a whole.

Response Containing the waste under the cap and cover system at the Building 103 dump is protective of both human health and the environment. The construction of a cap and cover system over the dump will help contain the waste in the Building 103 dump and will reduce migration to ground water. The contaminated ground water associated with the dump will be addressed separately. By excavating the soil and ash at the Building 503 burn sites and then transferring the soil and ash to the Building 103 dump,

the Army is remediating the Building 503 burn sites. The Army is not creating additional waste through this action. The Army is attempting to consolidate waste from different areas into a single waste management unit, at which waste can be more easily contained, and the effectiveness of the remedial action monitored. Moving the contaminated ash and soil from the Building 503 sites to the Building 103 dump and covering it will eliminate the current risks posed by the ash and soil, and will reduce the potential for contaminants to move from the ash and soil to ground water. Capping will reduce the potential for contaminant migration from both the ash and soil and from wastes in the Building 103 dump.

The Army concurs with the comment that a more hazardous situation would exist for on- site workers and off-site personnel if the Building 103 dump were to be excavated, since excavation of the dump would greatly increase the risk of detonation of buried unexploded ordnance with subsequent chemical release.

COMMENT SET 2 received May 19, 1994, from technical advisors to the APG Superfund Citizen's Coalition who are associated with the University of Maryland Program in Toxicology.

Comments on Assessment of the Potential for Interaction Between Building 503 Ash/Soil and Building 103 Dump Contents, April 15, 1994.

This brief treatise concludes that the potential for undesirable interactions between the chemicals present in the ash/soil of the Building 503 pilot plant burn sites and the Building 103 dump is remote. Overall, the conclusions reached in this document are valid, due primarily to the fact that the chemicals in the 503 ash/soil will be present in low concentrations, particularly after they are mixed with uncontaminated soil. It may be possible to further ensure that interactions do not occur, however, through consideration of the following comments and questions.

Comment 1 What would be the approximate ratio of the mix of 503 material with compacted earthen material? What would the overall "dilution" of the chemicals of concern be?

Response The approximate expected volume of contaminated soil and ash from the Building 503 burn sites is 470 yd3. The planned thickness for the subbase for the cover over the Building 103 dump is at least 2 feet. The approximate area to be covered by the subbase is 55,600 ft2. The total estimated volume of subbase fill is approximately 111,200 ft3 (4,120 yd3). The approximate volume ratio of burn site soil and ash to off- site fill is 0.129. This does not include the additional material placed over the subbase to form the cap and cover.

Comment 2 Since the acidity of the soil is an important determinant of the mobility of the metals, will the pH of the soil mix be determined? Could lime be added to neutralize the soil if necessary? Would conditions in the dump favor an acidic environment?

Response In general, pH adjustment to neutral or slightly basic conditions will reduce metal mobility. Most metals form positive ions in solution and tend to be more soluble and less well sorbed under acidic pH conditions in soils. However, unless carefully controlled, lime addition could actually increase metal mobility. The minimum solubility point occurs at a different pH for each metal. The minimum solubility points for typical metal hydroxides cover a range between 7.5 to 11 (U.S. EPA, 1993). With a mixture of metals, the pH adjustment point must be carefully selected and controlled to ensure optimum immobilization. Immobilization by lime addition should not be required and might prove detrimental for some metals. Primary containment is provided by the cap and cover system.

Comment 3 The first complete sentence on page 4, paragraph 1 is unclear. What would the volume of the material influence the reducing conditions?

Response The word "volume" was intended to mean space in general, and not

the actual measured volume. The sentence should have been more clearly phrased such as "The electrochemical conditions in the material under the cap will not be sufficiently reducing to favor conversion of zinc, iron, aluminum, or cadmium to metals."

Comment 4 What is the temperature under the cap likely to be? Are there any data from other caps that would allow a prediction of what temperature one might expect?

Response Because of the low degradation rate in a rubble landfill, and because the dump has been covered for about 60 years, the temperature within the dump is most likely similar to inert subsurface environments in this area, or about 55°-60° F (13°-16° c). Also, soil within inches of the surface tends to track seasonal temperature variations. Typically, the ability of soil to transport heat is sufficiently low that soil acts as an insulator. Insulation due to the soil causes temperature variations to decrease as depth increases. For example, a surface variation from 10° C to 30° C is damped to about 15° C to 25° C at 1 meter depth. At depth below 3 meters, temperature variation is small and the soil temperature tends to be close to 20° C (Hillel, 1982). The selection of 258 C for calculation of the Eh-pH diagrams was based entirely on availability of free energy data. However, 25° C should be a reasonably accurate representation of the temperatures under the cap.

Comment 5 Will the concentrations of carbonate and sulfides in the Building 103 dump soil be determined, so Eh-pH diagrams can be constructed? Perhaps the earthen material with which the 503 soil/ash material is mixed and be tested for carbonate and sulfide concentrations and adjusted so as to favor an environment inducive to low mobility and low reactivity of the metals.

Response Immobilization of the contaminants will be provided by the cap and cover system. Additional reduction of mobility of some metals may occur due to a variety of natural precipitation and sorption mechanisms. The carbonate and sulfide levels could be measured and Eh-pH diagrams generated based on the in-situ composition. However, adjustment of the soil chemistry with carbonate and/or sulfide is unlikely to add significant additional immobilization. Therefore, these measures are not planned.

COMMENT SET 3 received May 19, 1994, from technical advisors to the APG Superfund Citizen's Coalition who are associated with the University of Maryland Program in Toxicology.

Comments on Proposed Plan - Interim Remedial Action for Aberdeen Proving Ground (APG) Edgewood Area, Maryland, Building 103 Dump (Immediately North of Building E5422), April, 1994.

Comment 1 Pre-construction tasks include magnetometer sweeps to assess the presence of ordnance in the Building 103 dump area (Page 8, column 2, para 3). How will the magnetometer "hits" be verified to determine whether they are ordnance? What action will be taken if ordnance are detected? To what extent will this entail digging down into the dump itself? Will items other than ordnance that are uncovered by this digging be removed from the dump area?

Response The purpose of the geophysical survey is to obtain as much information as possible about the extent of the dump and the contents of the dump. The results of the ground-penetrating radar survey, when used in conjunction with the magnetometer results, may make it possible to differentiate between buried objects and will give an idea of the contents of the dump and the location of possible ordnance. The location of anomalies will be retained for future reference since this information could be valuable if it is necessary to excavate the dump. Another purpose of the magnetometer sweep is to verify the ground penetrating radar for delineating the extent of the dump. No excavation will be performed as a result of information obtained during these activities, and no waste will be removed from the dump.

Comment 2 Is there any indication of subsurface/gas/vapor generation at this time. If so, what type of gas or vapor is present? What type might be expected to be released in the future as the material in the dump deteriorates?

Response The only gas monitoring done to date at the Building 103 dump was performed during the removal of bromobenzylcyanide residue from a buried process

vessel in 1992. No background gases/vapors were detected at the dump during that removal action. A soil gas survey will be performed during the 30 percent design effort at the Building 103 dump. The types of gases which would be expected to be released would be minimal levels of methane due to the decompostion of previously undecomposed organic matter, and possible vapors from leaking buried process vessels. The Army says anything from solvent vapors to chemical agent vapors could be released, which is why the soil gas survey is being performed. The soil gas survey will assess the type and concentration. A gas collection treatment system will be installed to collect any gases or vapors which could be released at future date under the cap. Any current ongoing release is venting directly to the atmosphere, which is another reason for constructing the cap and cover system.

Comment 3 How will the extent of the burrow system be assessed? (Page 8, column 2).

Response The extent of the burrow system will be assessed by a biologist who will conduct a visual examination of the dump and the surrounding area. A more detailed assessment is unnecessary since the cap and cover system will be designed to deter rodent invasion.

Comment 4 What are drill cuttings? What areas of APG will they be from?

Response The term "drill cuttings" refers to the subsurface soil brought to the surface when drilling holes in the ground, as for example, when installing wells. Drill cuttings used as fill material will be certified non-hazardous soil from locations in the Edgewood Area of APG.

Comment 5 The zinc and lead in the soil from the Building 503 site are said to be in cationic form and thus are non-mobile (Page 9, Column 1, para. 2). Have leaching experiments with this soil/ash been done? Under acidic conditions?

Response Lead leachability tests were performed on a number of samples as part of the Treatability Study performed in 1992, and as part of further characterization in mid 1993. The leaching test applied in 1992 was the EP Toxicity Extraction test, and the leachability test applied in 1993 was U.S. EPA SW-846 Method 1311. The commonly used name for this procedure is the Toxicity Characteristic Leachability Procedure (TCLP). The leaching fluid was an acetate buffer with an initial pH of 5. The pH after the extraction period typically ranged from 5 to 6. The TCLP is currently the required method for determining if a solid waste exhibits the hazardous characteristic of leachable toxicity under the RCRA regulations (4o CFR 261.24).

Comment 6 Filters on the gas collection system will be retrofitted if necessary (Page 9, column 1, paragraph 3). What would be the cost of retrofitting compared to installation of an active gas collection system at this time? Perhaps in the future, with further decay of old drums, etc., the release of gas/vapors would significantly increase. Are there any plans to analyze the gas vapors released from the dump on a routine basis after the cap is installed to monitor for the gaseous chemicals not being given off now?

Response A cost benefit analysis of retrofitting the vents versus installing an active system initially will be performed as part of the 30 percent design phase. No data are yet available on this comparison. The current plan for the gas venting system is to install carbon canisters on the vent outlets to absorb any gases/vapors released from the dump. The carbon

filters will be replaced at regular intervals. Apart from possible air monitoring equipment to be installed in Building E5422, there are currently no plans to actively monitor for gas/vapors.

Comment 7 Will the perimeter fence be designed to help keep out groundhogs and other burrowing animals? (Page 9, column 2, paragraph 3).

Response The perimeter fence was originally intended to keep people from walking on the cap and cover system, and is an option for limiting access to the dump area. It may or may not be included in the final design. Whether or not a fence is included will depend on the outcome of further design efforts. If a fence is used, it will not be constructed to deny groundhogs or other animals access to the dump. The cap and cover system will be designed to serve that purpose.

Comment 8 In addition to maintaining the gas collection/treatment system, APG should be responsible for monitoring the gas/vapor released from the dump on a scheduled (perhaps every 6 months) basis.

Response See response for comment 6.

Comment 9 Since the caps proposed in the alternative action plans (#2-#6) have a finite life expectancy of about 20-25 years, thought should be given to the "ease of replacement" of these caps. Is there any significant difference between these caps in terms of what actions would be required to replace them? Will the cap be replaced automatically after 20 years, or will the cap be monitored for signs of deterioration? If so, how?

Response Of the various Alternatives, Alternatives 2-4 are MDE industrial caps with a single barrier layer. Alternatives 5 and 6 are RCRA caps with dual barrier layers. The RCRA cap and cover systems are more protective than the industrial cap and cover systems. Both RCRA cap and cover systems include geosynthetic membranes. A RCRA cap (Alternative 6) is the selected alternative. Although clay layers would be easier to replace than geosynthetics because of the anchoring requirements for geosynthetics membranes, clay alone is not as protective as the dual system with geosynthetic. Therefore, ease of replacement is secondary to protection of human health and the environment, and is not the driving force for the design of the cap and cover system. The cap will not be automatically replaced, but will be monitored on a regular basis for signs of settlement and failure of the cap layer. Ground water under the dump will also be monitored for changes in concentration of the contaminants.

COMMENT SET 4 received May 19, 1994, from technical advisors to the APG Superfund Citizen's Coalition who are associated with the University of Maryland Program in Toxicology.

Proposed Plan - Interim Remedial Action for Aberdeen Proving Ground (APG), Edgewood Area, Maryland, Building 503, Smoke Pilot Plant Burn Sites Operable Unit, April, 1994.

Comment 1 The propose plan for excavating and relocating the contaminated soil/ash from the 503 burn sites to the 103 dump where it would be placed under RCRA cap is both a cost-effective and human health protective remedial action step. The major drawback to this solution is that its long-term effectiveness is not as great as that of alternatives #2, 3 and 4 since the contaminated soil/ash remains on-site at APG and will need to monitored in future years. Because this monitoring will coincide with that established for the 103 dump site, the additional cost and effort should not be significant.

It is imperative that not only the on-site workers but also APG employees working in the area of the 503 burn sites be protected from the contaminated dust and particles that are dispersed during excavation of this soil and its removal to the 103 dump site. How will this be accomplished?

Response During excavation of the soil/ash, dust control measures will be used to minimize dust dispersion. Some options currently being evaluated include spraying of water, water with a soap-like substance, and water with biodegradable vegetable gum. In addition, when the soil is dumped into plastic lined trucks for transport, the trucks will be fitted with spray nozzles to wet the soil as it is dumped to prevent dust dispersion. The trucks will also be covered during transport. If the soil is stockpiled (for example in roll-on, roll-off containers), it will be covered with plastic sheeting, dust control foam, or some other material to minimize dust generation. Also, this interim remedial action will be conducted under a Health and Safety Plan so as to minimize adverse health effects to on-site workers and off-site personnel. The plan will require established work areas to control the spread of contaminants. The work area, which will have the highest concentrations of contaminants, is called the exclusion zone. The exclusion zone is surrounded by a contamination control zone and a support zone. One or more contamination reduction corridors will pass from the support zone, through the contamination control zone, and into the exclusion zone. The contamination reduction corridors allow controlled movement of personnel and equipment to and from the exclusion zone. Decontamination procedures will be will be set up in the corridor to minimize uncontrolled movement of contamination out of the exclusion zone. Finally, monitoring will minimize risks to on-site workers and off-site personnel.

Comment 2 What were the conditions used for TCLP lead analyses? Did they mimic a "worst case" situation as it might occur in the 103 dump site? This information could be useful in predicting the leachability/reactivity of this material in its new environment.

Response Lead leachability tests were performed using both the EPA Toxicity test and the TCLP test. The TCLP is designed to simulate the disposal of solid waste in an uncontrolled multiwaste landfill, and should be a reasonable reflection of worst case conditions in the Building 103 dump. The TCLP analysis method is EPA Solid Waste Procedure 1311 as described in SW-846, Test Methods for Evaluating Solid Waste. The requirements of Procedure 1311 were followed for all analyses. Some specific features of the procedure as applied to the Building 503 ash and soil samples are highlighted below:

The TCLP includes special provisions for separating liquids and solids in samples. These were not required since all samples were dry solids.

The TCLP includes special provision for size reduction and screening. These were not required since all samples contained particulates smaller than the maximum allowed size of 9.5 mm.

The TCLP calls for a sample size of at least 100 grams. This is the sample size used for the analyses.

The TCLP extraction requires the use of one of two extraction fluids depending on the alkalinity of the sample. Extraction fluid 1 contains 5.7ml of glacial acetic acid and 64.3 ml of 1 normal sodium hydroxide mixed with water to make 1 liter of fluid. The pH of extraction fluid 1 should be 4.93 ± 0.05. Extraction fluid 2 contains 5.7 ml of glacial acetic acid mixed with water to make 1 liter of fluid. The pH of extraction fluid 1 should be 2.88 ± 0.05. Extraction fluid 2 is used for wastes with a pH over 5 and the ability to neutralize a prescribed quantity of acid. None of the samples tested required the use of extraction fluid 2.

The TCLP calls for the weight of extraction fluid used to 20 times the weight of the solid material extracted. For all samples this translates 2,000 grams (or about 2 liters) of extraction fluid. This amount of extraction fluid was used in each extraction.

COMMENT SET 5 received June 23, 1994, from the Executive Director, Aberdeen Proving Ground Superfund Citizens Coalition.

Letter - Proposed Interim Remediation Plans for the 503 Burn Areas and the 103 Dump

Comment 1 Enclosed please find our comments regarding the Interim Remediation Plans for the building 503 burn areas and building 103 dump site. As you are aware, Aberdeen Proving Ground Superfund Citizens Coalition (APGSCC) consists of concerned citizens who live in close proximity to Aberdeen Proving Ground (APG). As we represent the effected communities, we do hope that the Army will carefully consider these comments during this decision process.

On behalf of APGSCC, I would like to take this opportunity to thank you, John Wrobel and the others involved for the time and effort spent on these sites. It is our sincere hope that the Army will continue to make progress in characterizing the Canal Creek study area, so the best remedial actions can be initiated in a timely manner.

Response The Army welcomes all comments and will carefully consider all comments received.

Comment 2 Aberdeen Proving Ground Superfund Citizens Coalition (APGSCC) has carefully considered the available information regarding the Building 503 burn areas and the Building 103 landfill. Supported by our technical consultants, Penniman & Browne and University of Maryland Program in Toxicology, APGSCC has reviewed the Focused Feasibility Studies pertaining to these areas, as well as the Proposed Interim Remediation plans. In addition, several of our representatives attended the public meeting held by the Army on May 24th, and APGSCC convened two additional meetings to discuss our concerns. It is the strong belief of APGSCC that there are too many data gaps to support the financial investment of the recommended interim cap at the present time. The issues behind this conclusion are outlined in the following paragraphs.

The fact the actual dimensions of the landfill are not fully know is a serious concern to APGSCC. At the May 24th meeting, John Wrobel said that recent magnetometry readings confirmed that the dump extends further south than the area to be covered by the cap. It is our recommendation that the Army perform a more definitive delineation of this boundary prior to any initiation of cap construction.

Related to the landfill delineation issue is gas migration. At the public meeting, John Wrobel discussed how the Interim Remedial Action includes the emplacement of monitoring equipment in the basement of building E-5422. Whether or not the cap is constructed, this effort is vital to the protection of those individuals working in this building. Therefore, we believe that the army should proceed with this initiative without delay, if these steps have not already been taken.

APGSCC has a variety of concerns regarding cap construction. A major concern for APGSCC, as well as the Army is contaminant migration. The Building 103 landfill cap will have a three-foot gravel and cobble layer, a two-foot compacted soil layer, a one- foot layer of sand and will be covered by a two-foot layer of compacted soil. This cap construction will add many tons of weight to the site and will exert a downward pressure. It is known that the water table aquifer is extremely close to the surface and already contaminated. APGSCC is concerned that the hydrostatic pressure caused by such a cap may push the contaminated water downward and radially outward, thereby expanding the area of contamination and displacing any interstitial gas. Since reducing contaminant migration is the goal of building a cap, we believe this possibility of increasing contaminant migration must be addressed before deciding whether placing a cap on the site is the best action.

A second area of concern regarding cap construction is the ever present concern with unexploded ordnance (UXOs). John Wrobel said the Army planned to place a two-foot layer of soil around the site to disperse downward pressure and provide a buffer area should an explosion occur. APGSCC would

like to know if the Army has any data available on the effectiveness of this technique based on previous experience at military installations. Not only would an explosion be hazardous to personnel at the site, but the potential that highly toxic gases may be released from containers in the site substantially increases the dangers.

When and if this cap is constructed, it will have to be maintained. We believe the engineering plans for the cap should contain a very specific Operation and Maintenance (O & M) Plan that includes a procedure for monitoring and repair. In this plan, such issues as the possibility of groundhogs burrowing in from across the street, and damaging the water impermeable layer from underneath, must be addressed. We also feel that the development of this plan should be included in the CERCLA public participation process.

Overall, the lack of information that exists for this site is troublesome. As stated by the Army at the public meeting, RI/FS's are currently being conducted at various SWMUs in the Canal Creek Study Area, including the ground water which is being investigated as a separate operable unit. Although it is known that the ground water beneath the 103 site is contaminated, it is not known whether this landfill continues to be a source of contamination to the ground water, and if so, to what extent. The Army's Installation Restoration Program (IRP) budget is finite. Therefore, we believe that the construction of this cap should be delayed while information is rapidly collected in order to characterize the sources of contamination and discern the overall pattern of ground water contaminant migration in the Canal Creek area. Technologies such as soil gas surveys may help delineate the solvent plumes in a timely manner (since VOCs are a co-occurring contaminant at most of the operable units). A better understanding of this study area would allow the funding available to be more cost-effectively distributed among the areas of highest priority.

While this investigation/characterization process continues, APGSCC feels that a few simple steps can be taken at the 103 landfill to reduce the infiltration of water. The groundhogs should be removed from the site, and their holes filled with dirt and gravel. Once these steps are completed, the Army will have to take active measures in keeping rodents from inhabiting the site in the future.

Lastly, our conclusion to delay cap construction leaves the resultant issue of remediating the Building 503 burn sites. It is the opinion of APGSCC that the contaminated soil should be excavated, stabilized, and transported to an appropriate landfill. Following this step, the Army should continue with its plan to back-fill with clean dirt and plant vegetation.

In closing, we would like to thank the Army for their continued commitment to work with the citizens toward the common goal of installation restoration.

Response The Army is currently performing a more definitive delineation of the Building 103 dump in order to determine the true extent of the dump. Geophysical surveys were performed June 28-29, 1994, to better delineate the extent of the dump. The data from this survey, and from the soil gas survey will be used in designing the cap and cover system at the Building 103 dump.

Existing data gaps will be addressed in the Canal Creek RI/FS, in which the Army will initiate a comprehensive soil, sediment, and ground water sampling event in the Canal Creek area. Under this work plan, soil, sediment, and ground water samples will be collected and analyzed. Soil gas surveys and geophysical surveys will also be performed in an effort to better assess the extent of contamination at APG-EA and to identify sources. However, it will be take time until the data is analyzed and interpreted, and even then, due to the many sources in the Canal Creek area (many of which may still be undiscovered), it may not be possible to determine if the Building 103 dump is an on- going source of contamination. Unfortunately, due to the many possible sources, it is difficult to "quickly discern the overall pattern of ground water contaminant

migration". Therefore, since the existing cover allows the infiltration of water through the waste, and since the cover soil is steadily eroding into the contents of the dump, the Army has determined that the construction of a new cap and cover system is a necessary interim measure to protect human health and the environment. While it is possible to remove the animals which currently inhabit the dump and to plug the holes, this action by itself will not prevent the infiltration of water into the dump since it does not prevent run-on, and because it does not address the issue of standing water on the dump. Also, it would not prevent continued erosion of the cover into the fill material, and it would not prevent the venting of any gases or vapors to the atmosphere. These issues can be addressed only by plugging the holes in the existing cover, and by grading the cover to a suitable slope. Grading can only be accomplished by placing additional fill material on the surface of the dump. For these reasons, the Army has determined that the construction of a new cap and cover system is the best interim solution until completion of the Canal Creek RI/FS and overall Canal Creek ROD.

Currently, no air monitoring is being performed inside Building E5422 because any gas/vapor emanating from the dump is venting freely through holes in the existing cap. It is very unlikely that any gases or vapors are migrating into building E5422 itself because the building is at the low end of the dump, and because a gas/vapor will take "the path of least resistance" and vent through holes in the cap rather than through cracks in the foundation of building E5422. Since Building E5422 has no basement, only leakage be addressed in the design phase of the cap and cover system, are the placement of monitoring equipment beneath the building E5422 slab or within the building itself. This will be addressed in the design.

The cap and cover system cross section presented in the Proposed Plan was a preliminary cross section design concept aimed at minimizing the infiltration of water into the waste. However, during the 30 percent design phase, the design will be refined with the added criteria of minimizing the thickness of the cap and cover system. This is necessary because of the proximity of Williams road and Hoadley road, and adjacent buildings. The cross section to be presented in the 30 percent design will have all the layers of the conceptual design presented in the Proposed Plan, but will be thinner and lighter than the concept presented in the Proposed Plan. The effect of such the cap and cover system on the hydrostatic pressure has already been investigated. Preliminary settlement calculations performed show that the total settlement of the existing cover will be approximately 0.25 inches. Therefore, there is little likelihood that the additional load of the cap and cover system to be constructed will expand the areal and vertical extent of contamination and displace any interstitial gas. If the waste compresses 0.25 inches, there should be a negligible effect on the hydrostatic pressure in the surficial aquifer.

The Army recognizes that the explosive detonation of ordnance of any type is hazardous to on-site personnel, and possibly to off-site personnel. To this end, data are available on ways of reducing ground pressure, and on ways of containing the effects of explosive detonation. The main factors in determining whether an underground detonation will break surface are the amount of explosive and the depth of the ordnance item(s),. Typically, if sufficient soil is present to absorb the energy released, then the explosion will be contained. This principle is used in in-situ emergency techniques for the destruction of single munitions. For example, single munitions encased in a plenum chamber filled with vermiculite or some other material can be safely detonated; the explosion is totally contained since the vermiculite absorbs the energy released (shock wave, heat, expanding gas). Another in-situ emergency technique is "massive encapsulation/burial". With this technique, the munition is buried under a mound of soil, which then absorbs the energy of the explosion. The additional fill material to be placed on the dump will perform this function, and will also dissipate the weight of personnel and equipment. As stated above, heavy equipment and the cap materials will produce additional loads on buried ordnance; however, the additional vertical pressure dissipates laterally with depth and is not transmitted directly to

buried ordnance. Only a portion of the additional pressure is transmitted to buried ordnance. The more fill is put down, the more the load is dissipated laterally. Standard Civil engineering handbooks can be consulted for the effects of dissipation of pressure with depth. To further reduce this load, grading equipment equipped with wide tracks or tires will be used. Since pressure is defined as force per unit area, this will distribute the weight over a wider area, further reducing the point load, there are many examples of this in everyday life, for example snow shoes is an example of spreading weight so as to be able to walk on snow without breaking through the crust.

The 100 percent design for the cap and cover system will contain a detailed cap and cover system Operation & Maintenance plan which will include monitoring and repair procedures. If necessary, this O&M plan can be included in the 90 percent design for the cap and cover system. It is unlikely that marmots will damage the cap and cover system from beneath by tunneling under the cap from the perimeter of the dump. Such intrusion would be apparent during O&M operations. Also, field studies have shown that rodents are do not appear to be able to penetrate High Density Polyethylene (HDPE). A study cited by EPA titled Requirements for Hazardous Waste Landfill Design Construction, and Closure, dated April 1989, states "In tests done with rats placed in lined boxes, none of the animals were able to chew their way through the [geosynthetic liners]".

The Army concurs that a better understanding of the Canal Creek Study Area is necessary. However, for reasons already stated above, the Army does not believe that construction of a cap and cover system should be delayed until the RI/FS is completed. While ground water data has already been collected during four sampling events by the USGS, additional ground water data needs to be collected during the RI/FS, and new wells installed in an attempt to better characterize the extent of contamination and to identify sources. The installation and monitoring of these wells will be a time consuming process. The collection, analysis, and interpretation of soil and sediment samples during the RI/FS will also be a lengthy process, and several rounds of data may have to be collected before the extent of contamination is characterized, and the sources of contamination identified. It will take time to gather the data and interpret it. The Army intends to cap a potential source of contamination while the time consuming work data collections process is being performed. While the data will be collected and analyzed as rapidly as possible, it can only benefit the aquifer quality to cap the dump at the present time, preventing additional water infiltration through the dump with possible further contamination of the ground water. Soil gas surveys can delineate plumes quickly, but are limited in their usefulness, particularly in an area with many potential sources, and with unexploded ordnance. It is more useful to study the scope of contamination in the study area. Contaminants other than solvents would be missed by a soil gas survey. In addition, a large area of ground water may be contaminated from several sources. An area wide study is needed to assess sources and define remedial actions. These questions must be answered by the remedial investigation currently ongoing. The Army believes that it is a proactive action to cap a potential source which will provide cost effective protection to human health and the environment while the investigation is going on.

The Army concurs that an interim action needs to be undertaken at the Building 103 dump. However, for reasons stated above, the Army does not believe that removing the groundhogs and filling the holes present in the existing cover provides sufficient protection to human health and the environment, since this action by itself will not prevent run-on, and because it does not address the issue of standing water on the dump. Also, it does not prevent continued erosion of the cover into the fill material, and would not prevent the venting of any gases or vapors to the atmosphere. This can only be accomplished by a cap and cover system. The Army will maintain the cap and cover system in accordance with the O&M plan to be published, and will take active measures to prevent animals from inhabiting the site in the future.

COMMENT SET 6 Received from Water & Wastewater Superintendent, City of Aberdeen, Maryland, July 18, 1994.

Comment 1 After reviewing the proposed remediation plans for the Building 103 dump and the Building 503 smoke pilot plant burn sites, the following is what I believe to be the best remediation plan.

First you need to combine alternative #3 excavation on-site stabilization using an organic binder with alternative #5 disposal at Building 103 dump and backfill using alternative #6 for the installation of a cap and cover system using sodium bentonite geocomposite liner.

A geosynthetic membrane would guarantee that the pollutants of concern would not escape the dump site by leaching into the groundwater if the liner were to fail.

Response Properly formulated and controlled treatment of the soil and ash from the Building 503 burn areas by solidification/stabilization would decrease the mobility of metals in materials. Trace organic contaminants may also be immobilized. Binding materials used for treatment of hazardous waste fall in two broad classes, inorganic and organic binders. Commonly used inorganic binders include portland cement, fly ash, blast furnace slag, and silicates. The most commonly used organic binders are thermoplastics, in particular asphalt. Application of organic binders is more expensive than application of inorganic binders. Organic binders are typically only used in special applications where the waste is unsuitable for treatment by inorganic binders and/or where the treated waste can be reused as paving asphalt. For example, asphalt binder is widely used to treat soils contaminated with petroleum products.

Treatment with either inorganic or organic binders would be implementable and effective in reducing the mobility of metal contaminants. However, the treatment process is not cost effective. The fixed cost for on-site treatment is high. Equipment to meter the binding agents and waste and then mix them must be brought to the site, set up, and tested. Treatability testing must be done to establish the proper mixture of binder and waste. The high fixed cost makes treatment of a small volume of waste, such as the soil and ash from the burn areas, very costly for the performance improvement achieved. Since the soil and ash waste will be effectively protected by a cap and cover system, additional immobilization by solidification/stabilization will not significantly increase protection of human health and the environment and will significantly reduce the cost effectiveness of treatment.

QUESTIONS FROM THE PUBLIC MEETING HELD ON 24 MAY 1994

Question 1 (Page 51) If the Army at some time excavates the contents of the Building 103 dump, will there be additional costs incurred because the Building 503 Burn site ash/soil has been included in the waste under the Building 103 cap and cover system.

Response Some additional costs would probably be incurred if the Army excavates the contents of the dump, and if the Building 503 Burn site ash/soil has been included in the waste under the cap and cover system. However, the additional costs are expected to be minimal since the volume to be put under the cap and cover system is small compared to the volume of fill material required and because all of the fill material under the cap and cover system would most likely have to be removed as hazardous waste.

Question 2 (Page 52) Has the feasibility of covering the Building 503 Burn sites with the a cap and cover system been investigated?

Response The feasibility of constructing a cap and cover system over the Building 503 Burn sites was assessed in a Remediation Feasibility Assessment. This remedial alternative was not considered further since it is not practical to construct a cap at the Building 503 site and at the Building 103 dump. Also, this would have been considerably more expensive

since the cap and cover system would have construction costs, and maintenance costs.

Question 3 (Page 72) How does this interim action tie into the overall remediation of the Canal Creek Area, and how do all the individual remedial investigations and feasibility studies being conducted at APG-EA tie together? Are data generated from one remedial investigation being used to supplement other remedial investigations?

Response Currently, in addition to several individual interim remedial actions, the Army is conducting a Canal Creek Area wide RI/FS and a ground-water investigation. All data collected as part of an action and/or remedial investigation are being used in other remedial investigations as much as possible. All data generated are entered into a single large data base. All individual interim remedial actions in the Canal Creek Area will be tied together with the Canal Creek RI/FS by a Canal Creek Record of Decision, or by a Record-of-Decision for the entire APG-EA. The APG-EA Record of Decision document will also tie in work being conducted in other areas of APG-EA, e.g., Carroll Island and Graces Quarters.

Question 4 (page 80) Is there technology transfer, cooperation, and exchange of ideas between government agencies, private industry, and foreign countries with respect to the remediation of contaminated sites?

Response There is significant cooperation, and interchange of ideas and technology between the various government organizations, and between the government and private industry. There is some cooperation between foreign countries in this area. Recently, there has been increased cooperation between the United States and the government of Russia in the area of chemical demilitarization and restoration of such installations.

3.4 PANEL OF EXPERTS

The following list gives the representatives of the Army, State of Maryland, and U.S. EPA who participated in the poster session and public meeting held on May 24, 1994:

John Wrobel, Deputy Program Manager for Canal Creek Area for APG

Ken Stachiw, Installation Restoration Program Manager for APG

John Fairbanks, State of Maryland Program Manager for the Building 503 Dump and Canal Creek Area

Steven Hirsh, U.S. EPA Region III Remedial Program Manager

3.5 SELECTED NEWSPAPER NOTICES ANNOUNCING DATES OF PUBLIC COMMENT AND LOCATION AND TIME OF PUBLIC MEETING

The announcement for the public meeting to discuss the interim remedial actions for the Building 503 Burn Soils Operable Unit and the Building 103 dump is attached at Appendix A.

APPENDIX A PUBLIC MEETING ANNOUNCEMENT

THE U.S. ARMY INVITES PUBLIC COMMENT ON PROPOSED REMEDIAL ACTIONS PLANS FOR THE BUILDING 503 SITE AND THE BUILDING 103 SITE AT ABERDEEN PROVING GROUND - EDGEWOOD AREA

The U.S. Army invites the public to attend a public meeting on the Proposed Plans for two environmental actions at the Building 503 Site and the Building 103 Site at Aberdeen Proving Ground.

DATE: May 24

TIME: 7 P.M.

PLACE: APG - Edgewood Area Conference Center, Building 4810

Also, the public an submit written comments during the 45-day comment period which runs from May 4 to June 17. Comments must be postmarked by June 17 and sent to: Directorate of Safety, Health & Environment, U.S. Army Aberdeen Proving Ground, ATTN: STEAP-SH-ER (J. Wrobel), Aberdeen Proving Ground, Maryland, 21010-5423.

Proposed Plan for Building 503 Site

The Army constructed Building 503 during World War I and used the site for a variety of manufacturing, testing and disposal purposes. Sampling shows the soil in two areas behind the building contains elevated levels of metals (lead and zinc) and two substances used in the manufacturing process (hexachlorobenzene and hexachloroethane). The Army is proposing to excavate the soil and has evaluated different alternatives. The alternatives the Army evaluated are:

Alternative 1: No Action (required by law to provide a baseline for comparison).
Alternative 2: Excavate the soil and transport it to an off-post industrial landfill, backfill the site with clean topsoil.
Alternative 3: Excavate the soil, on-site treatment by stabilization, dispose of the soil at an off-site industrial landfill, backfill the site with clean topsoil.
Alternative 4: Excavate the soil, transport the soil to an off-site hazardous waste landfill, backfill the site with clean topsoil.
Alternative 5: Excavate the soil, dispose at APG's Building 103 site under the final cap and cover system proposed below, backfill the site with clean topsoil.

The preferred alternative at this time is 5. The Army proposes to excavate the soil to a depth of one foot, remove about 470 cubic yards of soil, and to place the excavated soil at the Building 103 site. The Army would use clean topsoil to restore the site to the natural contours of the area.

Proposed Plan for Building 103 Site

The Building 103 site is a former waste disposal and burial area. The Army used the site starting in the World War era until the early 1940's. Since disposal records were not required during this time, there is little information about what was placed at the site. The Army believes the site may contain miscellaneous debris and possibly chemical agent residue and ordnance items. The Army's studies show the site may be contributing solvents to the ground water at the site. There is no direct public exposure to any site chemicals, and the water beneath the site is not a source of drinking water.

The Army evaluated different alternatives to contain the waste and to block rain and surface water from moving through the site and carrying substances into ground water. The Army also sought an effective alternative prevent animals from burrowing at the site. The alternatives the Army evaluated are:

Alternative 1: No Action (required by law to provide a baseline for comparison).
Alternative 2: Install a single-liner cap using off-post clay.
Alternative 3: Install a single-liner cap using a higher quality clay and sand (bentonite geocomposite liner.
Alternative 4: Install a single-liner cap using a rubber-like material (geosynthetic membrane).
Alternative 5: Install a double-liner cap using off-post clay and geosynthetic membrane.
Alternative 6: Install a double-liner cap using a bentonite geocomposite liner and geosynthetic membrane.

The preferred alternative at this time is 6. The Army proposes to construct a multi-layer cap and cover system in accordance with federal requirements for hazardous waste landfill closure. The cap would cover an

area of approxi- mately 1.7 acres and would have a cobble/gravel barrier to limit animal access. Two impermeable layers would limit the movement of water into the site and substances from the site into the ground water.

The preferred alternatives may be modified or new alternatives developed based on public input. The final remedies selected will be documented in Records of Decision that summarize the decision-making process. APG will summarize and respond to all written comments received during the comment period as part of the Records of Decision.

Copies of the Focused Feasibility Studies and the Proposed Plans are at the APG information repositories located at the Edgewood and Aberdeen branches of Harford County Library, Miller Library at Washington College, Essex Community College Library, and the TECOM Public Affairs Office at APG.

If you have questions regarding the meeting or proposed action, please call APG's 24-hour Installation Restoration Program information line at (410_272-8842.

APPENDIX B PUBLIC MEETING TRANSCRIPT

COMMUNITY MEETING U.S. ARMY ABERDEEN PROVING GROUND INSTALLATION RESTORATION PROGRAM

DATE: TUESDAY, MAY 24, 1994

TIME: 7:30 P.M.

PLACE: APG EDGEWOOD AREA CONFERENCE CENTER BUILDING 4810

REPORTER: BARBARA J. RUTH NOTARY PUBLIC

** BEL AIR REPORTING * 838-3810 **

MR. MERCER: Welcome to our public meeting here this evening. The purpose of this meeting is to discuss two proposed actions at the Canal Creek Study Area, Building 503 and 103, in the Edgewood Area of Aberdeen Proving Ground.

I'm George Mercer from the Aberdeen Proving Ground Public Affairs Office. My role tonight is to act as host and moderator. We also have up front with us Mr. Ken Stachiw, and he is the chief of the Conservation and Restoration Division and our Directorate of Safety, Health and Environment; and Mr. John Wrobel, who is the Project Officer on the projects we're here to discuss this evening. We also have Mr. Joe Craten, who is the Director of the Directorate of Safety, Health and Environment; Mr. Steve Hirsh of the U.S. Environmental Protection Agency; Terri White from the Environmental Protection Agency; and Mike Toreno of the EPA as well.

From the Maryland Department of the Environment, we have John Fairbank and Fred Keer, and they're all here to help us this evening.

Did everyone here get an agenda, or are you

aware of an agenda, do you need one? Okay. We have -- okay, everybody's got what they need.

After Mr. Stachiw and Mr. Wrobel make their presentations, we will open up the activity for questions. We have index cards, we can take down written questions, or if you are so moved, you can present your questions in person -- we'll just call on you at that time.

I would point out to you that the reason things are covered up out here is there's conferences going on in the building tomorrow morning, so please don't touch any of the covered up items out here in the hallway.

Also, I would like to remind you that we do have at Aberdeen Proving Ground an installation information telephone line, and if you haven't picked one of our pencils that has our number on it, you can just pick it up on your way out, and that will get you -- if you have a question or a problem or any other concern, you can call that telephone number, and we'll get back with you with a response.

We also have cards you can fill out to get on our mailing list out there. So any of you that have any of those things you want to do, you can stop on your way out or grab me, and I'll help you get whatever you need on that -- or Ms. Harris back there, she'll help you get it.

As this is a formal meeting, we are required to have a court reporter record all of our proceedings. This is our court reporter. And the transcript of what we do tonight will be located in repositories in the area libraries, so we can tell you what those are if you want to know. In fact, they are listed on our fact sheets that you may have picked up in the other room when you were looking at our exhibits. If you did not pick up those fact sheets, and you want to have a written down somewhere the areas of those repositories, you can go back in at the end of the meeting and pick them up, rather than me reciting it to you.

With that taken care of, I think that takes care of our introductions and logistics, and other

announcements. And I think we'll just move onto Mr. Stachiw.

MR. STACHIW: Thank you, George. Thanks for coming out this evening and your interest in our project. What I'm going to do is give you an overview of how this fits into everything else that's going on at Aberdeen Proving Ground. For some of you here, I'm going to bore you to tears, okay, because you've heard this so often. Others probably don't know for sure what's happening or know how this fits in with everything else, and so we thought it'd be wise to spend five or ten minutes to go over just the big picture.

What I'll be speaking about is the installation and restoration program at APG. As you can see, we have what we call here at APG the four pillars of our environmental program. We have prevention, conservation, compliance, and restoration. What we're speaking about tonight is restoration. This has to do with the cleanup of past disposal sites. Sites that were closed and done with before much of any kind of environmental regulation existed. We had to do some

historical searches to find out what we did in the past, and to see if there's contamination coming from it. If there is, to find ways to clean it up.

To separate from that is compliance. Although we have a compliance program to do restoration, the normal compliance, you deal with it on a day-to-day basis, that would -- there's another program at APG run by another division chief. Okay? That has to do with water pollution control and air pollution control and the movement of hazardous wastes from existing operations, where they're making hazardous waste as we speak, you know, even now.

So then we have a conservation program -- some people that are dedicated to managing the wildlife here at APG and making sure the cultural and historical resources are preserved and taken care of.

And we have a prevention program, and that's a program where we're trying to prevent the problems here from occurring again. We're thinking hard about what we do before we do it. Okay? So things like an EIS would come under this arena. Okay?

Now, things such as the project manager for Chemical Demilitarization is not part of my realm of responsibility. Okay? The stockpile falls more under compliance than it does under, at all, under the restoration program. Hopefully, whatever we do will be done right, and there won't be a need for restoration as far as that's concerned.

So I just want to keep us focused on that. We're going to be talking about the cleanup of -- we're talking primarily about the program we have for cleaning up the past activities.

As most of you might be familiar, we have a map of Aberdeen Proving Ground here. This is the Aberdeen area, this is the Edgewood area, Grace's Quarters and Carroll Island, all this area here, part of Aberdeen Proving Ground. The installation, the Aberdeen area, was founded 1917, 1918, was devoted to the testing of military equipment, vehicles, weapons. The Edgewood area was devoted to the production, research, provides the chemical warfare agent. As you can imagine, I've said many times, because of the kind of activity, the

dealing with lots of hazardous materials, the need to dispose those materials, the fact there was no science or too much science involved in the way things took place at this time, we ended up having a number of different places where waste may have been disposed of inappropriately in accordance with modern approaches to doing things.

We spent three years searching records upon records looking for past activities, and came out with a 1000-page document, and another one about 500 pages -- the 500-page for the Aberdeen area, the 1000-page document for the Edgewood area -- and enumerated what we termed 318 solid waste management units for the total post. 270 roughly for Edgewood, another 50 or so from the Aberdeen area.

Now, the numbers are impressive, but a solid waste management unit may be something maybe the half the size of this room where they stored drums. It may be something as large as the Michaelsville Landfill a 31-acre landfill, where we had municipal refuse disposed.

Because of the immensity, the size of this, we worked with the regulators as well as collaborated in collecting them into 13 study areas for the sake of the ease of management.

Here's the traditional map we use for this, although one of the study areas is missing here, the western boundary. But the color code breaks the whole post into 13 different study areas. Of these 13 study areas, this area here, Grace Court of Carroll Island are on the national priority list. Also Michaelsville Landfill is on the national priority list. There is some concern, and people are raising the issue, whether the rest of the Aberdeen area should be on the national priority list. That's not the subject for tonight's meeting. Okay? We'll be talking more about this area here, the Edgewood area.

Now, in concert with confining things to 13 study areas, we worked with the regulators for the State EPA, and we entered into an interagency agreement with EPA, which develops the structure for how we are to manage the study and the cleanup of these sites. The

fact that we've identified 318 units doesn't mean there are pollutants. All we're saying is that this is a place where waste was managed, it was stored, not necessarily disposed, where there may have been a release of hazardous materials in the environment. We don't know for sure there were or not. All we knew is of a record that something was done there. Okay?

So what we do is we go back and we research these areas, monitor them, take samples, and see if we can discover anything that may have taken place there -- if there is any release or any evidence of release into the environment from those sites. Is there any evidence the material is somehow still there, about to release? That's part of the study. And the EPA has somewhat criticized, but I still think a very, very good approach, to investigating these particular study areas.

Once you've identified, said, here we have a site -- this is the diagram, the flow diagram for it.

The first thing you would do is a preliminary assessment, site investigation. You'd go out to the site, take a look at it, maybe take a soil sample or two, and make a

determination as to whether this thing doesn't even exist anymore, or whether or not there's something maybe here, we'd better look into it. If it get nominated past this, okay, it moves into the RI/FS stage.

If we have enough data, there may be enough data to rank it. Okay? Say, gee, we can measure a release. We think it's near a water supply. With this ranking system, it can be put on a national priority list. Okay? A national priority list is not done by someone wanting it to be there because they don't like it. It's got to do with a ranking system with regards to the degree of hazard it imposes to health and environment. Their chance of release in a pathway contaminants into man or to the ecology.

If there's enough information, it can be placed on a national priority list. But putting this aside, whether it's on it or not, this is a nice phase in terms of where we study this. The next stage would be a remedial investigation. This is where we would actually put wells around, maybe take more soil samples, and determine if there's a release at this site of something

to the environment -- either to the groundwater, to the air, wherever. And then make a determination as to how far is it going, where will it get to by when, to see if there's any particular risk associated with it.

A risk assessment is done at this stage as well. And then we would also do a feasibility study. And with this information and remedial investigation, we make determinations as to what we should do with this. What is the best way to manage this particular site? Do we do nothing? Do we put a fence around it? Do we dig it up? Do we suck groundwater out from underneath it? Or do we put a cap on top of it? What do we do in order to remediate this site?

Sometimes this process takes a long time to develop the information that you normally need to stand up in court and say, this is final. And sometimes it makes no sense to let something continue to release into the environment while you're trying to come up with definitive information to allow you to stand in court with this piece of information and say this is without a doubt the final decision, and everyone around agrees with

it.

Sometimes when you get data, sometimes instead of getting answers, you get more questions with more data. It doesn't always provide all the answers as you need them. Okay? So in the meantime, we do a thing called an early action ROD. This normally, once you complete the RI/FS, you lead to a record of decision. This record of decision will lead to remedial action, and then eventual monitoring. We are allowed, under our interagency agreement, to do what's termed an early action ROD. An early action ROD is where something makes common sense to do now and is not likely to be contradictory to a final solution. And you're allowed to go in and say, okay, public, we want to do this now. It's not the last thing we plan to do here, but we will plan to continue studies some more, but we think we want to do this now to stop continuing release into the environment. Okay? We want to stop this release now, so we have a little more relaxed time to study and come to the right answer in this particular problem.

Tonight we'll be talking about an early

action ROD. This ROD, a game plan for a ROD for all 13 study areas, early -- maybe as many as 20 early RODs for all the study areas totally. But right now we're going to be focused in this study area here called the Canal Creek area. We're right about here, probably no more than a driver and a three wood from one of the sites right now. Okay? The 503 and 103 -- well, maybe a Jack Nicklaus' drive and a three wood, in the old days.

And we're going to focus on these two sites, and John is going to talk about that. We're not going to be talking about O-Field or various other sites or Grace's Quarters and Carroll Island. You know, they each are problems which will have their own day. Okay? But today, today is for the 503, 103. These are two -- one's a disposal, where things were burned, disposed of; the other was a small landfill. And we're trying to combine an economic solution there that John's going to describe right now. So before I get him up here, are there any questions about the overview of what we're doing? We're here to make a decision about an early action -- not a final action, but an early action about

one site in one of the study areas. There are other sites in the study area besides the 103, 503, but we're just focusing on one particular segment of the study area. Any questions?

(No response from the audience.)

MR. WROBEL: Good evening. As Ken indicated, my name is John Wrobel. I'm environmental engineer and Ken Stachiw is my mentor, supervisor for these projects here. Like he said, we're going to be talking about two sites, the Building 503 and the Building 103 sites. I'm using the old building number system in this program. There is, right now, no Building 503. There hasn't been a Building 103 in many, many decades here. I'm just using them as -- because in the information in the library, identified, many of these refers to it as the sites. Actually Building 503 is Building E-5265 right now. As I said, Building 103 was demolished decades ago. It doesn't even exist anymore. I'm just those as sort of a context to kind of focus in with where and when the activities occurred. Building 5265 does not do what it had done prior. It's not that

type of facility anymore.

(Whereupon, slides were presented with the following narrative.)

Again, I'd like to reiterate, these are earmarked, these aren't finalized, and these are early things that we think make sense to do at this point. We will look at these decisions again based on your input, based on more information we gather as part of remedial investigation, to see if these things actually make sense in the final context of the whole remediation, the whole cleanup, of the study area we call Canal Creek and Edgewood Area.

We've got a comprehensive study. It's going to take several years to do. It's a big site. It's a complex site. A lot of people say it's one of the most complex sites in the country. These actions are very obvious. I think they make sense to do at this point, but we're here to talk about them with you, present the information, listen to what you have to say about them. We may alter our decision based on your input. Right now, we've discussed things with the

Environmental Protection Agency and the Maryland Department of the Environment. They have agreed with, have a consensus there this thing has been -- these projects have been briefed to the technical review committee, which comprise of a group of citizens that meet on a quarterly basis to talk about the remediation projects at APG. We seem to have a consensus from that particular group, technical assistance grant folks, the people that represent the Aberdeen Proving Ground Citizens' Coalition have received these documents, we provided briefings with them. I've gotten preliminary response from then all indicating that these things seem to make sense at these sites at this time.

Where these sites are located -- when you came to this meeting today, you probably drove by both of these sites. We're located here in the conference center. The first site I'll be talking about is the Building 503, Building 5265, it is right here. If you came down Hoadley Road, it was this building here, the fenced-in complex on your left-hand side. When you leave, it's going to be on the right-hand side.

Building 503 was constructed in World War I as a chemical agent filling facility. Between the war years, it was used as a miscellaneous shop, carpentry facility. Again in World War II, it was set up as a fill plant for incinerary conditions, things that -- a bomb that would cause a fire is what incinerary is. After the war and during the war periods, it was used to manufacture and produce experimental smoke material. What a smoke munition is, it creates a screen that prevents the enemy from seeing what you are doing. It provides a big cloud of smoke. So some of the off specification material may have been burned at this site. There is no burial on this site based on what we have seen from the site records and from the sampling that was done at this particular site. As you can see, it stopped at about 1975.

And again, what some of these smokes are you've seen some of the different documentaries and whatnot, it could be red smoke, green smoke, used to signal purposes.

This is what the site looks like currently.

This is the north burn area, and it's an area devoid of vegetation. It is very clearly defined where these activities took place.

This is a view of the south burn area. Again you can see, very well defined, the extent of where those activities occurred.

This is to give you an overview diagrammatically of the area. This is old Building 503, current Building 5265. The north burn area comprised of about 10,000 square feet. The south burn area consists of about 2,000 square feet. The volume of contaminated soil based on our soil sampling program is about 470 cubic yards of soil. The extent of contamination seems to be just in the areas that are devoid of vegetation at this point, nothing grows there, and it goes about a foot deep. That seems to be about where most of the contaminants are.

To give you some kind of perspective unit 470 cubic yards of dirt is, a dump truck, a normal dump truck you see on the highway is about 20 cubic yards. So this is about 20, maybe 22, dump truckloads full of

contaminated soil.

As part of that study that Ken was talking about where we identified -- there is 318 solid waste management units -- we some preliminary sampling at the site back in 1986. that's what allowed to have this ranking score and listing of the whole Edgewood area as a national priority list site. In 1989, based upon the results of that particular study, and the obvious that this site is contaminated area, we brought in the EPA Environmental Response Team out of Edison, New Jersey. They did a special study for us to see if there's any way we could stabilize this waste. In other words, was there anything we could do -- and what we mean by stabilization is mix it up with concrete, make it so that it doesn't release anything, make it into cinder blocks and maybe dispose it at some other location. We did that.

Subsequent to that in 1993, we had Battelle organization, which is a not-for-profit organization, running the Canal Creek remedial investigation for us, take additional soil samples, look for the amended

contamination. In the year '86 was just a small study to identify areas of concern. This '89 study was just to see if the waste could be stabilized. In '93, it was more of a what you would call an investigative kind of study where you could see what the exact extent of the burn area was. And as I say, we found most of the substances, the contaminants, in the top foot.

I'm just going to throw this up, and I don't want to spend -- but this is not at that site. But this is what a soil sampling team looks like here in the Edgewood area. And this is typical of any Superfund hazardous waste workmen taking soil samples. What you see here is that typically all the site workers are wearing white, what we call a Tyvek, it's a trademark, it's a garment to keep dust off of them so they don't bring it home. It's disposable. You can see that the shirt and the boots are taped to prevent -- primarily it's to prevent jiggers and ticks from crawling up into their skin. There's an air monitoring device located that's sampling air at the worker's breathing zone. And these workers right now are unprotected and don't have

any respiratory protection. But what happens, when this reaches a certain level that's defined by the Occupational Safety and Health Administration, OSHA, reaches a certain level, these workers would back off, put on appropriate respiratory protection. All this work is governed by health and safety plans that talk about contingencies for these guys and also for people in the immediate surroundings of the project, what would happen if this reading went off. And this is how they collect the soil samples. And he's got gloves on to protect any germal contact. Very typical. You'll see that more and more as all the projects get accelerated here. You'll see these type of people doing these type of activities on Aberdeen and Edgewood.

Again, these are charts showing north burn area, the location of some of the soil samples that we take. And similarly, I have a chart of the south area.

But most importantly is what we found. We found that these were primarily the contaminants. Everything else seemed to be below detection levels. In other words, the instruments did not see any other types

of contaminants. We found lead, zinc, hexachlorobenzene, hexachloroethane, which are components of the different smoke mixtures that were burned at this particular site. The highest concentrations in parts per million in dead areas and also in the grassed areas surrounding the site.

As part of our decision-making process here where we came up with the rationale for why this made sense to do at this time, we did a risk assessment. And a couple things to remember about a risk assessment, is just because you have chemicals, doesn't necessarily you have risk on site. You have to have -- it's like that triad the fire departments talk about. In order to have a fire, you need to have an ignition source, you need to have something that will burn, you need to have oxygen. If you break one of those legs of that triad, you're not going to have fire. The same thing with risk assessment. You have to have chemicals present. They have to be in a significant concentration. You have to have an exposure. In other words, it has to get either to a person or to the environment. If you don't have any of those things, you really don't have risk as such. You may have

something you have to deal with, but you don't necessarily have a risk until you have one of those three legs in that particular.

What we found is, because the site is fenced, the only people on that site are the people that work in that particular building, so there's no public exposure to the site. There's very limited exposure to water. It doesn't -- the site has been inactive since 1975. It has basically looked the same since 1975, so it's not really migrating off that site that well. But there is a small air pathway. In other words, when dust blows off the site, you can get some contaminated soil moving off that site.

What we found is the greatest, based on our assessment we did, that people working on that site are at the greatest risk. And the goal is to eliminate this particular risk to the workers on this particular site.

And what we found when we did the risk assessment, we identified, okay, it's the workers on this site. Well, what are the workers doing? Well, they are still working on smoke mixtures in that particular

facility. I can't give a lot of details. I don't know a lot of details what they're doing. But it's industrial work. They work with chemicals. They work with vehicles and maintain things in that area. So it's an industrial-type of scenario. So what we based our risk assessment for, is based on cleanup goals for that type of industrial activity occurring at the site, which is what people would use for a site in Baltimore or people would use in Harford County for an industrial site. These are the types of cleanup goals they would have in that particular site. If this was residential use, the levels would obviously, you know, be lower. And this is comparing the cleanup goals versus the concentrations.

You can see that we exceed our goals just in the burn area, but not outside that burn area. Keep in mind, this is an interim action. We haven't fully defined -- I don't know if Congress has fully defined what the ultimate use of the Edgewood Arsenal is going to be, whether it's going to be converted to a residential use, or whether it's going to continue to be a military -- you know, part of a military industrial complex. I have no

idea, but again, this is an interim action. This would be reevaluated if the scenario, the use, of this particular area or all of Edgewood Arsenal would be determined. And as we would go back in and cleanup or remediate those acceptable levels. At this point, this is what makes sense.

Now any -- when we're at this stage, we are ready to make a decision or non-criteria. We evaluate all the alternatives that we have to evaluate for. All the alternatives we go through go through the screening process. We look to see, and number one is protection.

Are we proposing something that's going to be protective? Is it going to meet laws that exist today? Does it have any long-term effect? Is it going to be long-term permanent? Those are the type of criteria. There's a few more. There's six more actually.

Does it reduce the toxicity of the waste? Does it reduce the volume of the waste? What does it do to reduce hazards? Can it be done short-term, or is it something that needs a lot of work to implement? In other words, it's just a pilot scale project or something

that may need some technology development to implement. You know, how quick can you do the fix? How technically feasible the fix is? Is it something that can work now, or something that we have to develop something to do something with?

And the last three we look at, and the reason why you're here, you know, we look at the cost. We look at, you know, if the State agrees with what the particular alternative we select. And number nine, and this is why you're here, we're here to solicit you input from the community to see if we have selected an alternative that's feasible to you all. And this is why we're here, and I really appreciate you all coming out here. This is very good. There's a lot of competing interests not to be here tonight, and I really appreciate that.

As part of this, we looked at five alternatives. Now, the focus feasibility study, which is in the Edgewood Area Library -- we also have copies of it in the poster section. You can look at it. If anybody's interested in receiving a copy of it, we'll gladly

provide a copy if you like. Leave a card with Katrina Harris down there, and we'll attempt to get you that particular study.

But what we have here in the focus feasibility study is we looked at, not only these alternatives, but other alternatives. And we screened those out earlier on before we applied the nine criteria I just talked to you about. So there are some other types of technologies that we looked at, but were screened out for one reason or another. It may have been too experimental. It had never proved itself in an actual field condition or that type of thing. So we looked at those. So there are other ones that aren't here, and I'd be glad to talk to anybody about those.

But we looked at these. No action alternative. The law requires us to carry that through with the nine-step criteria evaluation. We looked at excavating the soil, bringing it to an industrial landfill, sampling results seemed to indicate this is non-hazardous, so it could go to an industrial landfill that was permitted to accept it.

We looked at on-site treatment and solidification, remembering that the environmental response team proved that this waste material could be stabilized with portland cement and fly ash, and it could be, you know, landfilled in an industrial landfill.

Another alternative, we could bring it to a hazardous waste landfill and bring it there. It's perfectly acceptable.

And the fifth alternative is bring it and consolidate our waste at another site that I'll be talking about in a few moments, this Building 103 landfill.

To diagrammatically depict this, I have what I call the measles chart. What the measles chart does, the black circles means it meets the criteria. The gray is partially meets. And zeroes, it doesn't meet the criteria evaluation factors. No Action 1, you see is a big zero. It's not protecting us, so it's not carried through the rest of the analysis. It's not protective. Leaving the site as it is, is not protective. To a degree, we can all see that.

And these are the other alternatives, and the costs associated with implementing those alternatives.

This Alternative 3 where we have a partial gray here with short-term effectiveness, yes, the Environmental Response Team study did show it could be stabilized, but there would be some additional work actually stretching out the time frame. It wouldn't be a short-term thing. It is feasible. It can be done. It's proven technology, but it would not be as quickly implemented as some of these strictly excavate and move type of options.

Based on our analysis, we chose Alternative No. 5. It's protective. It can be done fairly quickly. Twenty to twenty-five dump trucks would move this particular waste out. It wouldn't have to be moved over any public highways. And any continued releases into the environment would be stopped.

And in summary, it's 470 cubic yards that we propose to move and incorporate -- in the next part I'm going to talk about the 103 Landfill -- to

incorporate in the 103 Landfill.

I'd like to go into the 103 Building. Again, you drove past it on you way in. There's the 503 site. The burn area is located in this area. The 103 was this brick building here on your right-hand side where you were coming on post. It's this fenced area here, the 103. The old Building 103 is actually located here. It's a fenced area. It's got some vehicles parked on it. That was the old Building 103 which was a, what was termed, a miscellaneous fill plant that filled different types of ordnance, bombs, with chemical warfare agents, high explosives, that type of thing. And for lack of a better term, it's called the 103 site, because some of the process equipment, some of the waste from that 103 facility could have been placed in this particular landfill.

The site was a sand pit when they were building Edgewood, building up Edgewood Arsenal. They used it as a burial pit. They took the sand and used it to make concrete. They used it as construction material. So that excavation that resulted was filled in from

miscellaneous junk and possibly ordnance items. This probably was one of the first landfills here at Edgewood Arsenal. Probably till about the late 1930s, early 1940s, this area was used for disposal.

We believe, based on some records of 1937, some type of cleanup occurred at the site. And the present cap, which has eroded away significantly, was placed on the site. And the site was used sometimes as an early recycling effort to remove insulation off of copper wire. But we don't know, there were no records kept, there were no requirements to keep records of what was placed in this particular dump.

Again, when you came on post, this is what you saw as you came down Hoadley Road. This is the current building occupied by the Technical Escort Unit. It's their headquarters. As you're looking at the site, you can see there are some holes and some bare areas here where the existing cap, cover system, is widely eroded away. The site has a chain-link fence around it.

This is what it will look like when you leave tonight. It will be on your left-hand side. There

are two monitoring wells located what might be down gradient. Building 103 was located up in this area. Again, you can see it's a depressed area. The lot has subsided and is settling in this particular dump.

As part of our remedial investigation, hydrogeologic assessment, the U.S. Geologic Surveyor came in and installed those wells I showed in the previous slide. We detected some contaminants in the groundwater that were sampled in 1987, 1989. As part of the whole remedial investigation, additional wells are being planned to be put in here to better define the contaminated aquifers associated with this. We don't know at this point whether contaminants we're seeing right now at these wells are from the dump or they're from another source, because there are over 45, maybe 50, different sites -- some may be large, some may be very small -- in this whole Canal Creek Study Area.

I want to spend a few minutes on showing how the groundwater monitoring was conducted here at APG. You see two workers at the 103 site. What they're doing is they're sampling a well. The well is right here.

This is the protective casing. They're drawing up through a pump. And what you'll see is a lot of these drums here. And what these drums are dong are collecting the purged water. In other words, the water that's standing in the well is not really representative of what's in the aquifer. We purge up that water, the water that's been standing there, to get a better representative sample of what's in the aquifer that we want to sample. And that water that we don't analyze for is placed in a drum and is analyzed for proper disposal. So the water drums, you'll see around a lot our wells. We are containerizing this type of material.

What this gentleman is doing, he's monitoring the water coming up from the well to see if it meets certain parameters that were established with the Environmental Protection Agency and Maryland Department of the Environment that say that is a representative sample. At that point, the sample is collected, sent to an off-site lab for chemical analysis.

Again, we did a risk assessment for this 103 site. We found that there was no exposure to the

public from the contaminated groundwater at the site. The contaminated groundwater is not a drinking water supply either on-site or off-site. Current monitoring that has been completed by the U.S. Geological Survey seems to indicate that the groundwater is flowing away from the installation boundary in a southeasterly direction flowing towards the Bush River. Complete extent of contamination, we don't mind. That's part of the remedial investigation of the site. But that's what the current mottling and monitoring that were conducted to date. We haven't stopped, though. We haven't got all the answers. But we're investigating that further.

What are goals were on this site are a little bit different than the 503 site. We want to continue to contain the wastes, and apparently the waste is not being contained very well, because that cap, the current cover system, is eroding. It's deteriorating. We want to minimize precipitation on the site. Like, right now what we have on this particular site is -- if you can best relate it to -- is a coffee filter. Rain water, surface water, is allowed to percolate right

through the cap, right through these big holes that the animals, groundhogs, have created in the current system, and react possibly with the material, junk and debris buried in the dump. So our goal is to minimize, to stop that from occurring, and also to prevent the animals from coming back in and eroding the current, the cap as it is today.

So those are our goals. They are very limited in scope for this site, because it's early action; it's not final.

We looked at six alternatives that are depicted in the focus feasibility study. Again, No Action, has to be carried through that nine criteria that we described -- like I described earlier. All these essentially are variations of theme, putting a cap on the site. There are different types of caps. Some will meet State requirements, some don't meet State requirements. Because we don't have a real good idea of what type of contaminants, the debris and junk that were buried in particular landfill, some of these may not be applicable. Because some of these, like the industrial

landfill, we have a handle on what was disposed of and it's protective enough for that.

So these five alternatives that we looked at are essentially variations on the same theme. I can go into a lot of detail about these in our focus feasibility study, but essentially it's different layers of protection to prevent surface water and rain water from infiltrating through the debris in the landfill.

And again, we evaluated these against the nine criteria, to see which ones they meet. Again, the same scheme, black being meets, gray is partial, zero doesn't meet. Again, No Action, does not meet any of the alternatives.

You see that the first three do not meet either a federal or state law for landfill capping, and this was determined with discussions with Maryland Department of the Environment.

As part of the focus feasibility study, we looked at all kids of alternatives. We selected those five that carried on to the nine-point analysis. As part of the focus feasibility study, we had to look at

excavation. These are some of the points to consider when considering excavation. Because we don't know the extent of what could be buried there, we'd have to err on the safe side, 150 percent safe, and we have a lot of safety precautions. It's been done in the past. It can be done in the future. It can be done today with the existing technology. It would be slow and time consuming. We'd have to relocate the people around the vicinity, possibly regroup the traffic and stuff like that, because we didn't want to exposure anybody to any possible accidents that could happen during the construction or excavations.

And then one of the bigger problems we have, and if you've been around EPG for a while and discussions about the mustard incinerator, if there are any types of wastes that have been identified that when we pull up don't have a location that they would go to, an off-site location, there would have to be stockpiles here at APG or stockpiles someplace. We couldn't just take them out of the ground and put them back in, and say, we don't have any place to go with them.

So that was one of the things that we looked at. We don't know but it's something that in the excavation you have to plan for, that some type of storage that we'd come across, a chemical warfare item or agent that would have to be stored long-term until the nation gets ahold of what to do with all these chemical warfare agents.

More on the feasibility, I would like to add that in the alternative versus excavation, that we looked at the particular cost and rough order of magnitude you can see it could range as high or even higher than $9 million to do an excavation. This does not count disposal. This is just taking the stuff, the debris and junk out of the landfill and characterizing it for disposal. Disposal would depend on what you found and the cost varies greatly in what you find.

So based on that, we decided to elect for Alternative No. 6, where it is installing a hazardous waste landfill cap system over the current exposed 103 dump. It will prevent the water filtration, which is one of our goals. The animal intrusion, it will prevent.

This is using well developed technology. This is not something that has to be developed. Hazardous waste landfills are being enclosed, several a year probably in this country. And a little bit higher cost than the industrial cap system that we talked about, but that low cost is not -- it's more protective. We ought to go with it.

And very conceptually, this is what it would look like. And as I was talking about previously, the 503 ash, that contaminated soil, would probably go in this -- not probably, it would go in this layer of cover soil which would bring the site up to grade and provide a good stable platform to build these other layers on. If this meets acceptance from the public, we've got the regulatory concurrence on these particular actions. The next stages are to design, bring this thing beyond concept into actual design and develop the specification that actually how this thing is going to be put together.

And everyone here, your neighbors, everyone is welcomed to get involved in this design process. We make the documents, the design documents publicly

available. We can have subsequent meetings on a design to see if there are any other concerns, things we've missed on this. We've got a very competent design engineer working on this project, but sometimes our focus is a little narrow. Your input is really important and critical for us to do these things the right way.

For both of these actions, the public comment period, we'll receive your comments in, public comment period ends on June 24. We will review those, and what we have, come up with a Record of Decision, which is a legal document signed by representatives from the Army, Environmental Protection Agency. It becomes how we conduct ourselves in this site. It's up for review in five years. It's an automatic five-year review on all of these projects when you have a Record of Decision. I also, if anything occurs during the design of this project or if anything happens while we're constructing the cap, if that's the chosen alternative obviously the Record of Decision gets reopened, maybe another public hearing is held, but it doesn't end right here. It could go on. The design step, which I want to

encourage you to participate in, would be a fall/winter project with hopefully getting the project going sometime in the early spring of next year.

As part of this project, and these actually supplement and complement the remedial investigation, is that we prepare a health and safety plan, a plan to ensure that the workers and the community and the people that work in that building are safe based on our activities. We do topographical surveys to define the topography so we can engineer the cap and pick up the elevations. A soil gas survey to see if there are any gases. Old landfills tend to produce methane. We do a survey to determine whether there was any methane generation and design into the design features to eliminate any methane accumulations in the building.

Develop vents, maybe charcoal filter the gases that may be coming up out of the landfill. We have to collect some data and design that in the process.

We'd borrow sources, this would be off-site clean fill. We would have to test it to make sure it meets certain parameters so we wouldn't have this

subsidence problem that we see today.

Thirty percent design. I said the concept it's got a lot of elements in it. It has these type of things listed in it. We talked about storm water management and erosion control. We talk about possibly designing in a gas methane system. Cost estimate, schedules, that type of thing, and all these roll up into a 30 percent design package. A big sheet of documents.

And after that, the 60/90/100 percent designs obviously incorporate any comments received on the previous design submissions which may involve any other inputs that we receive. In the schedule, it would have an engineer report. These are all standard. When you build a building, this is typically the type of thing that goes on in a 30/60/90/100 percent design. It's not atypical.

And in the Edgewood Public Library, the Aberdeen Public Library, Washington College Library, these are the documents that are available on the 503. They're available for your inspection there. They're

available in the poster section so you can see what these documents look like. If anybody needs a copy of these documents, we can try to get those to you.

Building 103 consists of these documents here.

And common documents that relate to both projects and relate to the whole Canal Creek area are listed here. Again, they're available. I'll just go through them rather quickly, just listing them. I'm not going to read them to you, but they're available. We can talk about those if anybody is concerned how to find them, how to get access to them.

At this point, I'm done my presentation on the particular proposed actions at 503, 103. I guess we open it up to comments and questions.

MR. MERCER: Do we have any questions or comments? Okay, if you would please say who you are and where you're from, so our court reporter --

MS. RICE: I'm Sue Rice, and probably most people here know I'm the president of the APG Superfund Citizens' Coalition. We have a few people who have

written comments prepared, and I think they'd like to present them. And for anyone here that doesn't know who we are, we're a nonprofit group that's been monitoring and studying all the activities, environmental activities, at APG. We have two TAG grants that allow us to hire technical advisors to help us understand all these documents that you keep sending for us.

But first, I'd like our vice president John Taylor, to give his comments. He's probably, even more important than anything we can say, one of the citizens directly in the affected area, and I think he would like to present his. And he has them in written form as well.

MR. TAYLOR: My name's John Taylor. Although I agree with the Army's restoration action at Building 503, to remove these residual white phosphorous contaminated soil, I have several questions concerning the approach to this decision and the additional hazards that I feel would be created due to these actions.

Number one, will any steps be taken to reduce the airborne dust created due to the excavation at

Building 503, such as watering it down or using some substance that would keep the dust down from going off into the atmosphere?

Number two, will the contaminated soil be containerized prior to moving it to Building 103 site? Or is it just going to be dumped into this site just like dirt into a pit?

My third question is, how will construction personnel know an existing cylinder or UXO currently buried beneath the surface of the 103 site has been ruptured due to vibration and the weight of all this heavy equipment vehicles running back and forth on the site? This has to do with their safety also. You could have a small explosion under the surface and heavy equipment operating, you wouldn't, you may not realize it happened. But then the substance could come up through the surface, and be very hazardous to them or anyone else in the area.

Number four, what safety precautions are being taken to contain any spillage or air release of hazardous materials due to rupture or detonation of UXOs

at the Building 103 site? And there is some, possibly there are some UXOs there, and some canisters of perhaps unknown substances. So I think we have to take some steps to protect, not only the workers, but the community also within the area, not knowing what this stuff is.

Number five, what are the tradeoffs the disposing of the contaminated soil off post instead of creating or adding to an existing hazard across the street, at the Building 103 site? In other words, you know, if we know there is a hazardous condition exists at the 103 site, so by moving this material across the street, we're just adding to it. So I go along with your capping idea -- I think the action was Action 6 -- except for the material from 103 going into that.

And the final comment, I feel that the Army's role is to clean up the existing hazards and hazardous wastes and not to create or add others, which I think we would be doing by moving the material across the street. I also feel that due to the instability that UXOs in buried canisters of unknown substance at 103, a more hazardous situation exists, not only for the

construction workers who are in direct danger, but the community as a whole, not just the Aberdeen/Edgewood area, but perhaps the civilian population within the area, not knowing what's buried under that site and what could happen when they start disturbing it or running heavy material over top of it, heavy equipment. That's all I have right now.

MR. WROBEL: I can say a few things about those. I can address your comments in a lot more detail, you know, as a response of this paragraph. I can send you a letter. I can send it to --

MR. TAYLOR: Certainly.

MR. WROBEL: -- your group. But let me just draw a few points. Okay? I wrestled with these same issues. I have the same concerns of, do you want this hazard on this site. Okay? We did a calculation, which has been sort of proven out on other sites here at Edgewood that when you place two feet of that first initial cover, that will reduce any pressure of heavy vehicles running on the site. In other words, you're not going to have a point. It's going to be spread out, so

we do not feel that we're going to create a detonation or a spontaneous detonation once we place that first two-foot cover just to kind of bring it to grade so we can provide a stable platform. And the reason why we're putting that stable is so we won't have subsidence of this layers on top of it to move that force, that weight out. It would move out as an aerial type of thing.

We've looked at it. I wrestled with that for a long time, because I had the same concern. I talked to our design people and said, you know, go find the experts and have them calculate this. And we do have some calculations where we looked at that in one of the studies, and I could share that with you at the poster section. I could bring that out and show you where it is. But we'll address your comment in writing at the end of the comment period. So I did wrestle that, and I agree that that is one of the big concerns here about any kind of landfill capping here. But based on looking at the information that we've developed -- our people are in Columbus, Ohio out at the Battelle organization. They've done explosives work across the country. They're

considered experts by the Army. They feel that this two foot of cover will spread out the force not to cause a spontaneous detonation, and it will prevent that.

MR. TAYLOR: Well, this two foot of cover, I'm sure you're going to do regardless, you know, whether you use that two foot of material coming from the 503 site or if you bring in external materials to provide that cover.

MR. WROBEL: Well, this 470 cubic yards that I'm talking about is just a small fraction of the total number of yardage associated with that two-foot cover, just a small portion of it. We plan on just putting it -- we're not putting it in a container -- we plan on just putting on the site. We feel, you know, based on looking at the different costs and the implementability, all those things are implementable. We take that, it's feasible, it's 20, 25 dump trucks or a couple roll-off those large, you know, cubic-large containers, we could handle this, move it off the site. We looked at the cost figures. You know, basically we looked at, we could do this particular action at a

significant cost savings and still be protective.

MR. TAYLOR: That's today.

MR. WROBEL: That's today.

MR. TAYLOR: But tomorrow when the site, when the 103 site has to be -- when there comes a time when the 103 site has to be cleaned up, you're going to have additional cost now of removing that additional waste material other than what's already there.

MR. WROBEL: But the law requires, the Resource Conservation Recovery Act, requires us -- we own that waste whether it's here or whether it's in another landfill in Alabama, we own that waste. That is not someone else's problem. It's still the Army's problem. That waste is still ours, whether we remediate it as part of that cover, if we ever excavate that particular landfill, or whether we go down to Alabama where that big landfill is down there and remediate it there, we still own it. Whether we put it as part of a bigger problem in Alabama, or we leave it here, try to manage it here on our site. My call is that, you know, we're still responsible for it. We have it significant cost savings

to do it this way. But that's how I balanced it. The EPA looked at it, too. We don't lost custody of this particular waste. It's still ours.

MR. TAYLOR: Has anything been looked into, the possibility of perhaps covering the 503 site, putting a cap on that area over there?

MR. WROBEL: That was one of the very early things.

MR. TAYLOR: Rather than moving the soil.

MR. WROBEL: What I talked about earlier, one of the very early things we looked at when we were screening out technologies, you do like a big brainstorming session. Here's the problem. You get all the guys around -- engineers, scientists -- they all sit down and they brainstorm the ideas. This sort of stuff you'd do on any other project. And you throw out ideas, and you don't throw out anyone's until everyone's got their ideas listed. Then we look at them to see, you know, which ones make sense. We do some, a little bit of analysis, some calculations. And we did look at that. We looked at stabilization and leaving it on-site,

putting a cap on it. It seemed to be more feasible since we're building one cap, doesn't it make sense, why not just put it all in one cap instead of building two cap systems. Because it would have to be the same type of cap. It would have to be this six-foot, what looks like be a four to six-foot cover system. So we would have a cover system here, and two cover systems across the street. I'm not saying that that's not feasible to do; it's very feasible to do.

But going with a cap system goes the maintenance cost. You can't just let it go. It has to be maintained. Whatever vegetative cover you put on that, it has to be mowed, so you're increasing your maintenance cost down the road.

We looked at that, and in short order, that's kind of why it was not screened further as part of our alternatives.

MR. TAYLOR: Along with that, when you removed the material from 503, then that's going to be restored, so it's going to have maintenance cost --

MR. WROBEL: Yeah, but it's not going to be

this big six foot, it's going to be to grade to the natural contours of the area. Clean backfill will be put on, vegetative to the natural contours. Okay. This is a flat area. It's not compressed. It's relatively at grade for that particular area. So that's what we would do to site restore that particular area. We wrestled with all of those things, and I think we kind of see a light on those things when we evaluate them.

But like I say, your comments, we have a reporter -- if you want to hand those to us, so we're sure we don't make a mistake on them, and we'll get back to you personally and to the president of the committee. We really appreciate you coming out.

MR. TAYLOR: And if you'll see that Sue here gets the comments; she's our president.

MR. WROBEL: Yes, we'll do that. Thank you. Thanks for coming out.

MR. MERCER: Any other comments, questions?

MR. SQUIBB: Katherine Squibb, University of Maryland, and I'm working as an advisor with APG SCC. Just to follow-up on your action at 103, if you -- when

you first go in, you're going to take all your magnetometer readings and try to determine where you have pits and things like that. It talks about that in your reports.

Obviously, you'll probably come up with some just because there's metal and everything else in there. To what extent will you perhaps just start getting in and opening that Pandora's box, when you start going after to determine whether or not, you know, they are surface things that you need to take care of before you start running over it with heavy equipment, or are you really going to try to identify them?

MR. WROBEL: We don't really plan at this point to do any excavation at all, period. The magnetometry which is -- you see the people on the beach with metal detectors -- that's essentially what magnetometry is looking for, metal objects. There's a couple other techniques, we all them geophysical techniques that evaluate what could be in the subsurface. Those type of things we're going to do that's going to supplement the remedial investigation. In other words,

see if we can map out the extent to this thing, so that when we get to the final answer to this particular site -- site closure -- the whole Canal Creek area and this particular site -- we'll have kind of an idea of what we're dealing with, what we have there. There are no plans.

MS. SQUIBB: So you're not going to worry about trying to take off surface munitions or --

MR. WROBEL: There are no plans. Now in the 503 site, previously we have found fuses laying on the surface. Those obviously would be recovered and you know properly disposed. They would not be put -- you know, there would be some sort of screening prior to moving. Get out any hazardous ordnance that may remain on that 503 site.

MS. SQUIBB: Put you'll be digging?

MR. WROBEL: Yeah, there will be actually digging. So there will be some -- we don't envision finding any UXOs there, but we have in the past found fuses which are about the size of this pencil that can take your hand off, is about what happens.

MR. SQUIBB: Well, as you define this site, and I know you said before something about, you know, this dump actually going perhaps under the building or under the parking lot, is that going to be studied later? Or in other words, when is that going to come up and be an issue, the extent of, you know, what you're not covering?

MR. WROBEL: Well, as part of the design effort, we're going to try to define using these different geophysical tools, magnetometry, metal detecting, to define the extent of it. Obviously, where the building is, you can't do a whole lot, because there's a building there. We're going to try to go around the area.

We've got a couple of aerial photographs that were taken in the late 1930s when the landfill may have been -- as a dump, may have been inactive. It doesn't show the Technical Escort building that's there. You can looked at the planned view of this particular map, and kind of see that there's a depression. It's deepest in the middle and it kind of goes out to the

sides. What appears is that the building may exist on a portion of the excavation. Whether there was any waste placed on these fringes, we don't know. There may be a little shelf here. It's hard to look, you know, based on this. You can look at the small picture, and you can kind of make it out.

You look at some of the planned views, you can see a little shelf and they went down deeper to make the burrow, to get the soil, and then to place the debris and waste in this particular unit.

It seems to be, you know, there's another road down here -- I can't recall its name, but it seems like it's limited to that area, but it may extend a little bit under the Technical Escort Unit and maybe under the parking lot. But that would be investigated as part of a remedial investigation. We do the first step as part of the design process and carry that through.

You know, the final solution, you know, I don't have a crystal ball. It might be to demolish this and extend it to where we can better define it. The final solution may be an excavation. I don't know. I

don't have that crystal ball. But right now, from this short term, early act interim, seems like this area here, the cap doesn't exist. We have a rain water, surface water, protruding into it. Put something in place, put a cork on it essentially, and try to look at the whole picture, see what we're going to do for the whole site.

MR. STACHIW: Just to add to what John's saying, the final solution could all involve in situ type treatment as well. That's something we're looking at so we're not transporting -- like Mr. Taylor was saying, just moving the problem here. Even if it wasn't moving it off post to someplace else, we'd like to eventually as we get into final solutions to be doing stuff on site, fixing it right there so it doesn't bother anyone again. That's what we'd like to do. That's in the final phase. Right now, we're just trying to make sure it doesn't, while we're developing the solutions, that we can prevent any further contamination.

MR. WROBEL: I had always hoped in my heart or hearts that the landfill is just this area in here. As more evidence is accumulating, it does not appear that

way. Like I said, this is an interim action, it seems like it is going to take care of some immediate potential problems we have right now. But I feel that down the road, this definitely will have to be revisited. It's going to take a lot of real smart engineers and scientists, and also you folks here that came to this meeting, and anybody else, neighbors, friends, that need to be involved with this process, that need to be here, so we can figure out what is the best thing to do here for the Army, for the nation, that type of thing, for this particular site.

The evidence seems to be mounting, it probably does extend a little bit more than southward than what I had really hoped to believe it had. But we'll address them as the data comes in, more information comes in. But we'll try to do an action now that seems to make sense, knowing that we're going to get to other things in the future. We shouldn't just wait for all the cards to come in and all the cards on the table. Let's see what we can do early on to resolve some potential problems.

MS. SQUIBB: We were talking earlier about how you were going to assure that the people in the building may not be exposed to gas that is released after it is capped and forced out. If you know, if you have just a minute to go through that, and I think that's an important issue.

MR. WROBEL: That is an important issue, very important. I mean, the people that work here, it is very important. The Directorate of Safety, Health and Environment would not allow us to do anything unsafe. What we plan doing, we have in the chart, a soil gas survey. In other words, we would put probes, things about this size, that have some kind of gas collection absorbent material, within the landfill, to existing animal burrows. We leave them in there for a time period, let them accumulate the gases. Then we'll take these particular tubes that have absorbent material in it, run it through a chemistry lab, and determine what determine what types of compounds may be present in the gases. And then based on that, we can get an estimate, yes, it's a problem, no, it's a problem, and then design

accordingly.

There are a couple of alternatives that we can look at and get involved in the design process. We can install instrumentation within that building, when a certain concentration is detected -- this is stuff that exists, it's off the shelf -- an alarm goes off, everyone leaves. We could do that.

It could be, I think we're really leaning right now conceptually, into putting some kind of gravelly type of gas collection. You know, gas would collect in the gravel, and a lot of it would vent off, and then maybe do an active, pull it and run it through some charcoal filters.

That's all, you know, we recognize it as a problem. We're going to do some investigative work to see what the extent of the problem is, and we're going to design something to deal with it. But it is important to us, and we definitely don't want anybody to unnecessarily. And on the flip side of it, if we do have a gas generation problem, it's going up into the air right now as we speak. So this cap will prevent that.

But we'll have to watch where the gas is --

MS. SQUIBB: And then filter it out.

MR. WROBEL: -- make sure it filters out before it comes out. So if we're getting presence of the chemicals does not necessarily mean there's a problem. You've got to have those three elements -- you have to have chemicals, the concentration, and also personal.

MR. FEENEY: I'm Brian Feeney. I'm with Penniman & Browne. And as I never tire of saying, I'm not only a technical advisor, but I live within two miles of APG. And I have several questions.

One of my questions is about whether or not the sheer weight of the cap is likely to cause hydrostatic pressure, a downward pressure. The water table is quite high, as the US Geo Study indicates, and it's known to be contaminated. Is there any data available on the fact of hydrostatic pressure, a downward pushing, onto that groundwater so that it would be contaminated, the water table would be spread out?

MR. WROBEL: I exactly know -- what I picture in my head is that -- I might say right now we

have a coffee filter. What you're talking about is we have like a tea bag that the groundwater reacts to pressure squeezing out contaminants? Is that what you're talking about?

MR. FEENEY: If you put a weight on top of your tea bag or on top of a filter, would it push out and say that you had a water table leading up to the bottom of your filter, would the weight on top of it push downward, the fluid grading push downward and then push out laterally in all directions, radial expansion? You don't have to answer it right now. It's a hydrogeologist's question. It's not an engineer's question.

MR. WROBEL: I'll tell you right now, I'm an engineer. I really don't have an answer. We have a couple of hydro people that would talk to you about that, will definitely respond to that in our records. I don't have a feel for it. I mean, the geologists are brought here, but we will definitely address that.

MR. FEENEY: We'll put the question on the record.

MR. STACHIW: Right. We will do the calculations.

MR. WROBEL: We'll do the calculations. We'll look at that. That's a good point.

MR. FEENEY: Okay. Another question I have, as I was reviewing the documents, I didn't see any specific information on the O&M Plan, Operations and Maintenance Plan, for the cap at Building 103. And my concerns are with failure in the cap, failure due to groundhogs, because while a cobble gravel barrier is pretty good, it isn't state of the art in caps. I know from cruel experience how pernicious and persistent groundhogs can be, and I'd like to know if there is a data base out there, there is data available on the tenacity of these buggers and what you might -- what you could be expected to anticipate. And should you have failures, either due to groundhogs or some other cause, I'd like to know how specific your O&M Plan is for addressing these failures.

MR. WROBEL: Well, the reason that the Operations and Maintenance, O&M in the engineering world,

wasn't addressed, was because these are proposed, you know, I think it is appropriate to mention those. Obviously, there would be some maintenance to insure that the cap's integrity would be there. The Department of Energy, who we've got as part of the design team on this particular project, has had experience of putting long-range planning and thinking on their sites as to how prevent animal intrusion. They've got sites that are all over the country, have all kinds of critters, and they've done that, and I rely on their expertise that, you know, we can definitely get together and talk about those specific references.

MR. FEENEY: In essence, I'm interested in the scope.

MR. STACHIW: It would have to be in operation. This goes to the solution, there's going to be operation and maintenance with any cap we put here.

MR. FEENEY: At which stage will it appear, the 30%, 60%?

MR. WROBEL: No. Probably later like around 60, 90%.

MR. STACHIW: In the design phase.

MR. WROBEL: Somewhere in the design phase. In fact, I had a meeting with the stake holders today -- people that actually occupy that particular building, and we discussed that particular issue today. We talked about what the final cover is going to look like, what kind of vegetation we're going to put it. Obviously, they have to look at it every day, outside their windows, so we had a meeting with those particular stake holders to talk about that type of concerns. Obviously, we want to have something that is maintainable, has a little bit of esthetics to it, that kind of thing. We've got a landscape architect as part of the team, we could bring in as part of the team, to develop a cap that would do -- relatively low maintenance. But that would be addressed in the design process.

I think Dr. Montgomery here -- he's with the Battelle organization, done a lot work in capping landfills -- maybe can give us a little bit on this animal intrusion thing.

DR. MONTGOMERY: On the question dealing

with is this a proven technology. We work, I work for Battelle, Pacific Northwest Laboratory. We are run under the auspices of the Department of Energy, Richland Operations, inn Hanford, Washington. One of the tasks that we have is to try to identify repositories that will last for the lifetime of radioactive materials. So we were looking for natural materials, manmade materials, plastic liners, things like that.

We don't really have an experience with how long do they last. Are they going to last 20 years? Are they going to last 50? Are they going to last 100 years? So that's why we went looking for technologies that utilized natural materials.

So this program was started approximately in the mid-'80s. And one of the documents that we have next door relates the experiences from that program. And we found that a layer of a gravel material does not maintain its stability when the animals dig down into it, and it keeps collapsing around. So the they go move off and find some other place. So for these caps, we're looking at trying to maintain these things for 10,000

years. And so that's why they went to the natural materials.

And part of my job is to take that technology and then to distribute it out to the general public and to other government agencies. And so that's one of the reasons that we looked at it, because for this project, I think it's applicable.

MR. FEENEY: That leads me into my next question about the length of the cap. The cap has about a 20-year life?

MR. WROBEL: I don't have any kind --

MR. FEENEY: But at any rate --

MR. WROBEL: It's probably at least 20 years.

MR. FEENEY: At any rate --

MR. WROBEL: 50 or 100

MR. FEENEY: The point I'm trying to make is that these measures are interim by definition. And what you said earlier that it will be revisited, it will certainly be revisited. And I guess what my question comes down to, does the Army acknowledge that all options

are on the table for the final remedial action. That it may be that removal, drastic and complicated as it is, it certainly is a very real possibility.

MR. HIRSH: I'm Steve Hirsh for the EPA. Back to the question on, do we have a reference. Terry Grim back there from Battelle gave me a book, because I was interested what are these animals doing. And you might want to get ahold of this. It's called Deserts and Dump Sites. And it gives a lot of information about burrows, and they track these burrows, and filled with the foam, what the animals do. That's a good reference for that.

MR. FEENEY: That's the University of New Mexico perhaps or someplace?

MR. HIRSH: One of those -- that's the best resource I found about what the animals actually do, and what can they get through and can't they get through.

This is a containment remedy, because the waste remains in place. Any time of those, there's a ROD for containment remedy, there's a five-year review. It's required, absolutely required, whether it's a final

action, interim action; it doesn't matter. You leave waste in place, five years later, you come back and you take a look at it. You look at all the technologies that are currently available at that time, five years from your decision, and you reevaluate the decision. It's necessary. It's part of the law. You have to do it.

Since it is interim, there needs to be a follow-up ROD, and of course, you know, anything -- everything's fair game in terms of a final ROD. This -- you know, what you need for an interim action is to do your best and insure that it will not be incompatible with a final option.

It's not likely -- I guess John brought up the point, that yeah, we may have an additional cost down the road because we're bringing in additional material, and that's true. The entire cap may become a waste. I don't know. We don't know about that. That could be. But it's not incompatible with the final remedy. If we're hauling waste out of there, and we have an increased volume in the future, then so be it.

But review is required by law.

MR. FEENEY: I only have one question remaining then. And that is, I'm a little fussy on how the various RI/FS fit together. There's the groundwater under Canal Creek, which -- if I have my nomenclature correct -- it's a mini study area.

And then eventually the Canal Creek's 49 operable units will be divided into clusters; is that correct?

MR. WROBEL: Yeah, it's how you're going to study different packets of sites. Now, whether we use the term "sites," "operable units," "areas of concern."

MR. FEENEY: Well, going back to your analogy, there may be data generated from one remedial investigation on the contents of the filter, and another remedial investigation dealing with the operable unit of the water at the site. And how would the two remedial investigations fit together? Would it be like at Westwood, where you have a large generic RI/FS, and then clusters or some other subdivision being formed under that umbrella?

MR. WROBEL: It's fairly confusing, but how

I envision it is that the whole Canal Creek area is going to have a remedial investigation, feasibility study, what to do with the whole site -- soil, the groundwater, sediments in the creek. It's all going to be studied in detail in the feasibility study.

To get to that point, we may have a few more meetings like this, where we've said, well, we've got enough information on this, we ought to propose an interim action.

But as part of the final solution, we will have a record of decision quite possibly for the Canal Creek area, and most definitely for the whole APG area. That would all tie all those things in and be probably a two-day public meeting to do all of that.

MR. FEENEY: And obviously, the point I'm driving at is that I wouldn't like to see different aspects of one larger phenomenon being disjointed by different RI/FS.

MR. STACHIW: That's a good point. Eventually, the whole thing's got to come together. And to make it even more precise, it's got to come together

at Grace's Quarters and Carroll Island as well. The whole thing has got to be one nice seamless garment is what it comes down to.

And in the process now, these study areas were put together for the sake of geographical convenience more than anything else. But we're trying to break them down into hydrogeological reality as to what influences what. Because decisions made for Canal Creek are going to influence basically what's going to be done at Gun Powder River, and it's going to impact on what kind of decisions you make for Grace's Court. So the decisions eventually all have to gel together so that risks in the entire area is mitigated.

So eventually, in the very beginning stages of trying to put together the big complicated situation, which you can see our work plan is a hugh series of curved diagrams -- like trying to land someone on Mars -- and then eventually having the whole thing come together into one ROD of the entire base. So that's the process. We're not trying to separate them independently of one another.

But sometimes you can go and see something that makes sense to do now, instead of just letting it go until you come up with a solution that might take ten years to come up with. There's things you can do now, and that's what we're trying to do. Does that help?

MR. FEENEY: That's very helpful.

MR. WROBEL: Another question?

MS. RICE: I think of a good bit of ours are written, and we'll submit them. But I think Dr. Squibb, did you want to go over some of your other written ones?

DR. SQUIBB: No, I think a lot of my others are actually ones to be addressed during the design phase, the way I'm hearing you. Actually the specifics on how you do things, like what filters and --

MR. WROBEL: Right, that all comes out in the design. That's correct.

MS. RICE: I think we have one set of written remarks to give you tonight, though, right, that they don't previously have.

DR. SQUIBB: Yeah, I can hand them in, with sort of detailed questions, and you can decide --

MR. STACHIW: All these questions will be included in the transcripts. A transcript of this meeting will be in the library. It won't be part of the record of decision, but will be part of administrative record. Everything that you heard today will be -- that's why we have a court reporter.

MR. HIRSH: This is Steve Hirsh again. The other thing that happens is, you know, these kind of comments that we gave you, too, become part of the record of decision, so the decision makers that actually sign these documents get that. It is actually three places -- the declaration gets signed by Deputy Assistant Secretary of the Army, the APG Commander, and my Regional Administrator. So there's that -- not the signature page -- there's essentially a "what's going on" section and it describes the alternatives, what's being done, what it alleviates, what the future is, and then the third part is called "response and summary," and all the questions are written down in there along with the written responses. So the decision makers get that as well.

DR. SQUIBB: Just one more question. You

said that eventually it would be nice to do this remediation in situ and clean this all up, and that's what we're looking for. Who's funding some of the work that will actually make that possible? Who's looking into bioremediation of, you know, chemical agents and --

MR. STACHIW: That would be part of the feasibility studies that we'll do, which will include pilot studies and things of that nature, when we start getting to the point of that -- like Brian was talking about, you know, for Canal Creek -- you may have two problems. You have the stuff that's buried and in the soil in this landfill, or other stuff that may be in sewer lines or whatever throughout the whole area, which would be problematic to dig up, and you have the groundwater.

So we're looking upon those things, it's the source and groundwater is two separate problems. Okay? Groundwater is something we're pursuing a solution to, and then -- and for the most part, groundwater is the vector that's causing contamination to leave. Whereas the stuff that's in the ground is either

going to groundwater or venting into the atmosphere, one or the other -- or maybe not one, maybe the other.

Then we would look at, what do we do with that stuff? Do we dig up the entire base, or do we find ways to treat it right in the ground itself, so it doesn't release into the groundwater anymore, it doesn't release into the atmosphere. Those are the kinds of things we would at least look at as one of the alternatives to digging up, or not doing anything, or something else. And part of what we need to do is pilot studies as part of the feasibility.

Survey existing technologies, see what's working, and then try it here and see if it works, and then with that, proposing that to the group.

MR. HIRSH: There are also other organizations. The entire issue of how you dispose of chemical weapons doesn't fall on Aberdeen's shoulders. There are other Army organizations and DoD organizations that are working on things, such as, how do you get the liquid fills out of the munitions? There are other agencies out there that are working on parts of the

problem. It's not just an Aberdeen issue. These things are in other places.

MR. WROBEL: And part of the resources that we've used is Department of Energy resources. They've got problems, in some ways dissimilar but some ways similar to us, so by establishing linkages with the Department of Energy National Labs, we get access to a lot of the information as it is learned. I've learned a lot from Dr. Montgomery about, you know, well, we tried that ten years ago, or three years ago, and it didn't work then. The technology hasn't improved. So that kind of information sharing between two big organizations -- the Department of Defense, the Department of Energy -- we've tried to do here at APG to kind of work together. Why should the taxpayers pay twice for the same type of research done someplace else?

So we're trying -- I'm trying to do that here, because I, you know, I acknowledge that there's a lot of information. Like Steve said, there are other Department of Defense activities looking at us, so we try to keep abreast by going to conferences and whatnot, try

to see what's out there, trying to bring in the best people we can find to work on these particular situations.

MR. FEENEY: That brings to mind another question. Not long ago, we had our counterparts in Russia come to the Joppa Library, and they live -- they're neighbors of APG's counterpart in Russia -- whose name I forget. Has there been any communication, maybe you both inventing the wheel in isolation?

MR. STACHIW: They spent the day with us here at APG. And they've asked for numbers of documents, which we've sent over to their point of contact in Kentucky -- the kinds of things we had that they were interested in. So, however, they didn't make known to us anything that they had that was of interest to us.

MR. FEENEY: Technology transfers.

MR. HIRSH: And we have sent delegations over there, and there's work, but in general, the technology transfer is that way.

MR. STACHIW: I think Battelle just announced last week, it was successful in receiving a

contract to support the Russian demil effort. They've been working this for several years, and we're one of the many organizations that is going to help them to clean up their problems over there. So this is a global thing and technology sharing, and what's going on throughout the states and throughtout the world today. Battelle is involved in Canal Creek, and so therefore, we will continue --

MR. WROBEL: Because it's such a complex site, we're trying to find -- well, I tried to find for the Army an organization that had that kind of reach. Battelle is a very large organization. It's a not-for-profit organization. It has access to a lot of information. They've been in this business of chemical warfare, and so there's going to be some kind of information exchange on that particular aspect.

So what I've tried to do is assemble a team of people. And why I'm here today to talk you all, is to bring you guys into the team also, have some sessions like this, technical meetings, look at the design, so we can come to grip with this kind of complex problem that

needs some kind of resolution in the future. And I'm hoping to establish that with the Department of Energy through Battelle. I have access to their incredible amount of information, lessons learned, and bring you all folks in to design projects, look at the remediations. I will send you copies of everything that Steve and John receives, you receive copies of all the work plans, the schedules, time frames, and that type of thing, for all the types of things that we're doing. That information is voluminous, but that's what we have to wade through, too, to get to the bottom of this.

MR. MERCER: Any other questions or comments? Yes sir.

MR. HESSELTON: Ken Hesselton from Harford County. Anyone that's concerned that their public representatives aren't here tonight, there happens to be a County Council meeting. Your council representative of District 8 and the Edgewood Area, Mrs. Hesselton is at the council meeting and regretfully not here. Also Mr. Barker who represents the Edgewood Arsenal is also there.

Now, if I can associate myself from that,

because there's one thing about this report that has disturbed me just looking at it. I haven't been getting involved here for several years. John and a few others will tell you I have been trying to be with the Citizens Coalition, citizens committees on this. I have a lot of respect for the people who work with the Army. But I am bothered by this for a couple of reasons.

You've described the site at 503 Building. You identified materials, lead, zinc, hexachlorobenzene, hexachloroethane. Then we come over to the site 103, which is obviously much larger. There's no statement as to the number of yards it involves. And there's statements like simply "there were groundwater samples found several solvents in the groundwater below the site." Nothing else describes the extent of materials on this particular site.

You conducted a study to determine that there's no direct public exposure to any site chemicals. And the water beneath the site is not a source of drinking water.

Well, I can go out in the woods and say,

that big old rotten land isn't going to hurt anybody, because there's no one standing under it. I'm somewhat concerned there's nothing that defines the speed of movement of the groundwater off that site, any indications as to what you're undertaking to determine exactly how far the contamination has been transported, and there's no indication you did any study to determine if compressing the water table at that point would tend to retain the materials in the vicinity.

It's just my impression that the toxins and the chemicals in the drinking water has been treated -- just looking at this document, nothing else -- very casually. That's all I'm going to say. I'm not saying you didn't treat it properly, but I read this, I get that impression. And that's a comment. It doesn't deserve an answer.

MR. STACHIW: You're right, okay, this doesn't attempt to address itself to groundwater problems, although I think Brian raised an interesting issue as to with this hastening in the ground. We know there's groundwater problems underneath, and we're

studying the groundwater overall in this area, with hopefully an interim solution be proposed for at least to start get feelings for what we think is a good solution and what you think is a good solution maybe about a year from now.

It's not moving that fast that you've got to be concerned about it in a year's time. We know that much. We have computer models of the groundwater below all of Canal Creek. But we're moving toward a solution. This is not attempting to address the groundwater as a problem per se. We will be -- that doesn't mean we're not trying to address groundwater. We are, and that's one of our -- that's our next highest priority in the Canal Creek area. So we'll be heading toward that one in about a year's time or so.

DR. MONTGOMERY: Another response to that, Mark Montgomery, with the compounds at 503, there are know health effects, there are standards, OSHA standards, for lead and zinc, and compounds like that. And so we have a good handle on, how do we protect ourselves if we're going to go on and sample it? So that

allows us to get in and get information on it.

In 103, because things could have been dumped there, chemical agents, could be munitions. At 503, you could go in and we can protect ourselves and do our sampling. At 103, how do you protect yourself against that one bomb that is six inches underneath the surface? You hit it, and it pops. And so what we're doing in our design is using remote non-invasive technologies to try to determine what's coming, what's being emitted out of it, as opposed to going in and physically taking the samples out of it.

So that's why there's a lot of information on 503, but there is not a lot on 103. And through the monitoring that we're doing with the groundwater there and through the vapors coming off, we're going to determine what's in there.

MR. WROBEL: I probably breezed by this too quickly when I did my presentation, but there are common documents within the administrative record that deal with the types of things that you're talking about -- groundwater chemistry report, hydrological data,

hydrodology of the Canal Creek area, talks about where's it going, how it's going. I'm sorry, I breezed through that very quickly.

MR. HESSELTON: All I'm saying is, this document glosses over it. I'm not saying you didn't do something. This thing makes it sound like you didn't. That's what I'm saying. You don't have to explain all this to me. I'm saying, this document makes it sound like, there's no problem there, nobody's going to drink it, and that's not a good clear concise comment that you should use when you've got toxic chemicals in water. When you found them there, and then you just say, well, it's no problem, because nobody's drinking it, is not-- is a poor comment to put in a document. You should say, it's contained, it hasn't migrated beyond this point, and we're studying it further. That, I could have bought. But this seemed to be a very careless statement in the document. That's all I'm trying to point out.

I'm not telling you what's there and you're not doing these things. I'm saying that this is what this thing says.

MR. WROBEL: I just threw this up, that we did look at, based on operations that may have occurred at Building 103, these are the type of things that could be expected to be found possibly in the dump. We did do a search based on particular processes that would have occurred. They're in the '20s and '30s, when that building would have been operated as a fill area -- the types of things that could possibly be there.

MR. PAUL: I just want to say that we can address that comment by making a revision to the package, putting out another revision.

MR. MERCER: Any other comments, questions? I would like to remind people that the public comment period for these projects runs to June 24th. They can call the information line, and that number is 272-8842. Or you can write,, you can send written comments to John Wrobel. That address is in the fact sheets, however I will read it to you. That's Directorate of Safety, Health and Environment, U.S. Army Aberdeen Proving Ground, Attention: STEAP-SH-ER (J. Wrobel), Aberdeen Proving Ground, Maryland 21010-5423.

That's is on the fact sheets. We will be going for a period of time, we can go back into the room where the displays are, and you can pick up a fact sheet or ask questions there as is necessary. But the public comment period does run to June 24th.

We also want to ask you on your way out, there are evaluation forms on the table out there. If you would please do us a favor and fill out an evaluation form and make any comments or whatever concerning this particular meeting and its conduct, and what changes, suggestions, whatever you might have; we would appreciate it. You can leave them, there's a box on the table out there.

In the meantime, if there are no other comments or questions, thank you very, very much for coming and participating. It makes everybody's job a lot easier by having your participation. Please feel free to go into the other room, now that we've gone over things, and look and see what we have. Thank you.

(Meeting concluded at 9:10 p.m.)

COMMUNITY MEETING - MAY 24, 1994

STATE OF MARYLAND)) CERTIFICATE COUNTY OF HARFORD, SS:)

I, BARBARA J. RUTH, Notary Public, do hereby certify that the foregoing public meeting held May 24, 1994 at the APG Edgewood Area Conference Center, Building 4810, Edgewood, Maryland, was taken and transcribed by me; and that the foregoing pages constitute a true and accurate transcript of the said public meeting.

I do further certify that I am not counsel for or in the employment of any of the parties.

In Witness Whereof, I have hereonto subscribed my name this the 8th day of June 1994.

<IMG SRC 0396215J>

MY COMMISSION EXPIRES: 04/07/96

(RECORDED TAPES ARE RETAINED FOR 30 DAYS FROM DATE OF CERTIFICATE.)

APPENDIX C REFERENCES

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Personal communication with Ms. L. Miller, Dames and Moore, Linthicum, MD.